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MANAGEMENT • PLANT • TRAFFIC • COMMERCIAL • LEGAL • ACCOUNTING •

# Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

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Guaranteed Circulation This Issue
10,477 of Which 9,941 is Paid

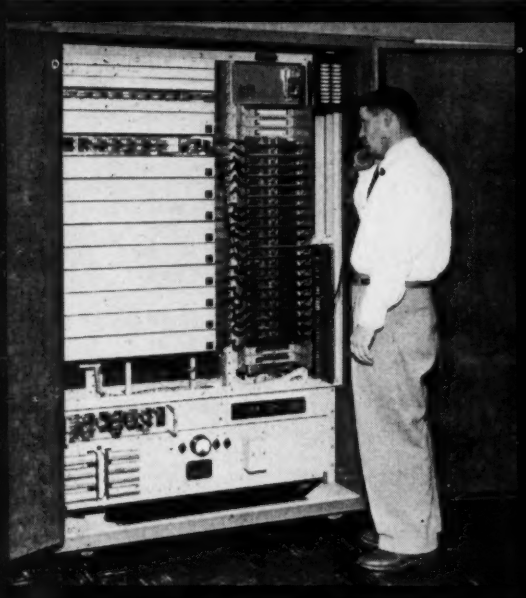
*Here's your newest Revenue-Maker,*
*for small businesses which need a dial PBX*

# Stromberg-Carlson "F-40" XY® 40-line Dial PBX

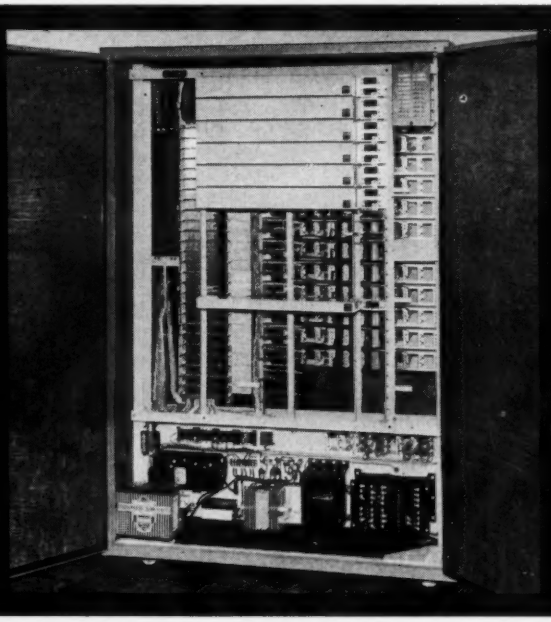
Now you can serve (and get nice income from) those business firms which badly need a compact internal dial system, with central office connections, but haven't a spare room or a lot of space for cumbersome bays, power supply, batteries and the like.

Stromberg-Carlson has "packaged" a system of top efficiency and modest cost, in a modern cabinet which looks just like a piece of office furniture. With capacity up to 40 local lines and 10 trunks, it is put into service merely by connecting the telephone cable leads and plugging the power supply into a standard 110-volt AC outlet.

The possibilities of this new equipment deserve your serious attention. Our brochure T-146 tells *all*. Why not request a copy today?



Front interior, with a test being made. Note thick Fiberglas acoustical insulation on doors and sides.

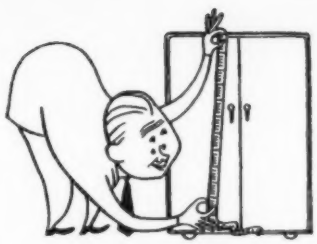


Rear view of the F-40 cabinet shows power supply in base with stand-by battery.

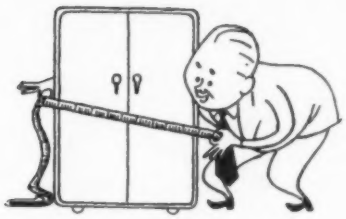
Attendant's station which may use a gray Tenite telephone with or without standard operator's headset.

**Stromberg-Carlson® ROCHESTER 3, NEW YORK**

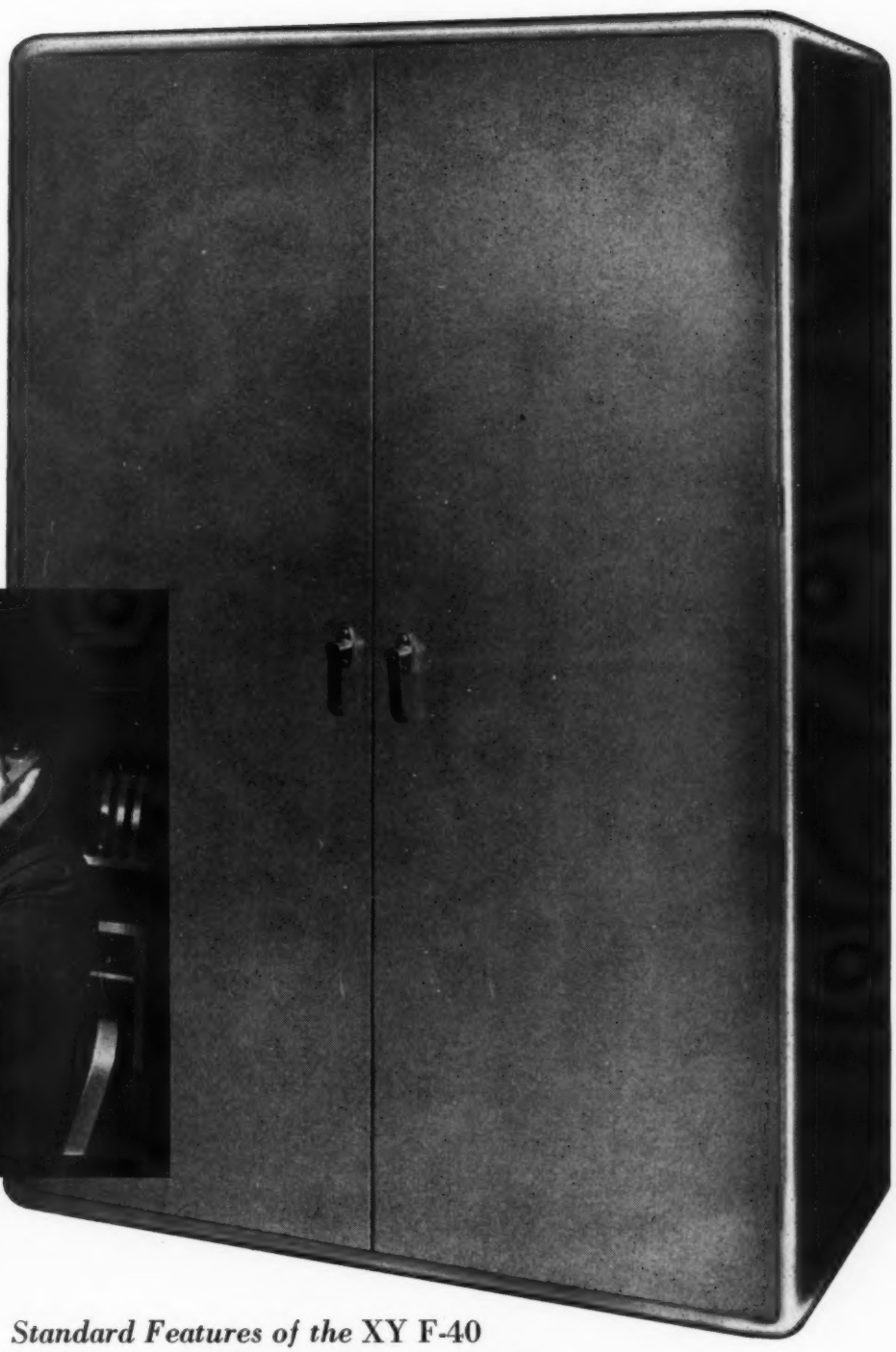
*Sales Offices: Atlanta 3, Chicago 6, Kansas City 8, Rochester 3, San Francisco 3 • Mfg. Branch, Dallas*

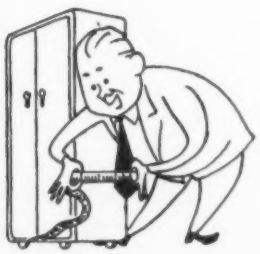


It's only this high (6′ 4″)

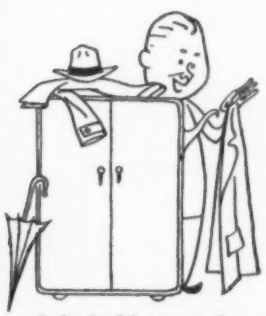


It's only this wide (4′ 1″)





It's only this deep (2′)



It looks like a regular office wardrobe

It rolls anywhere

## *Standard Features of the* XY F-40

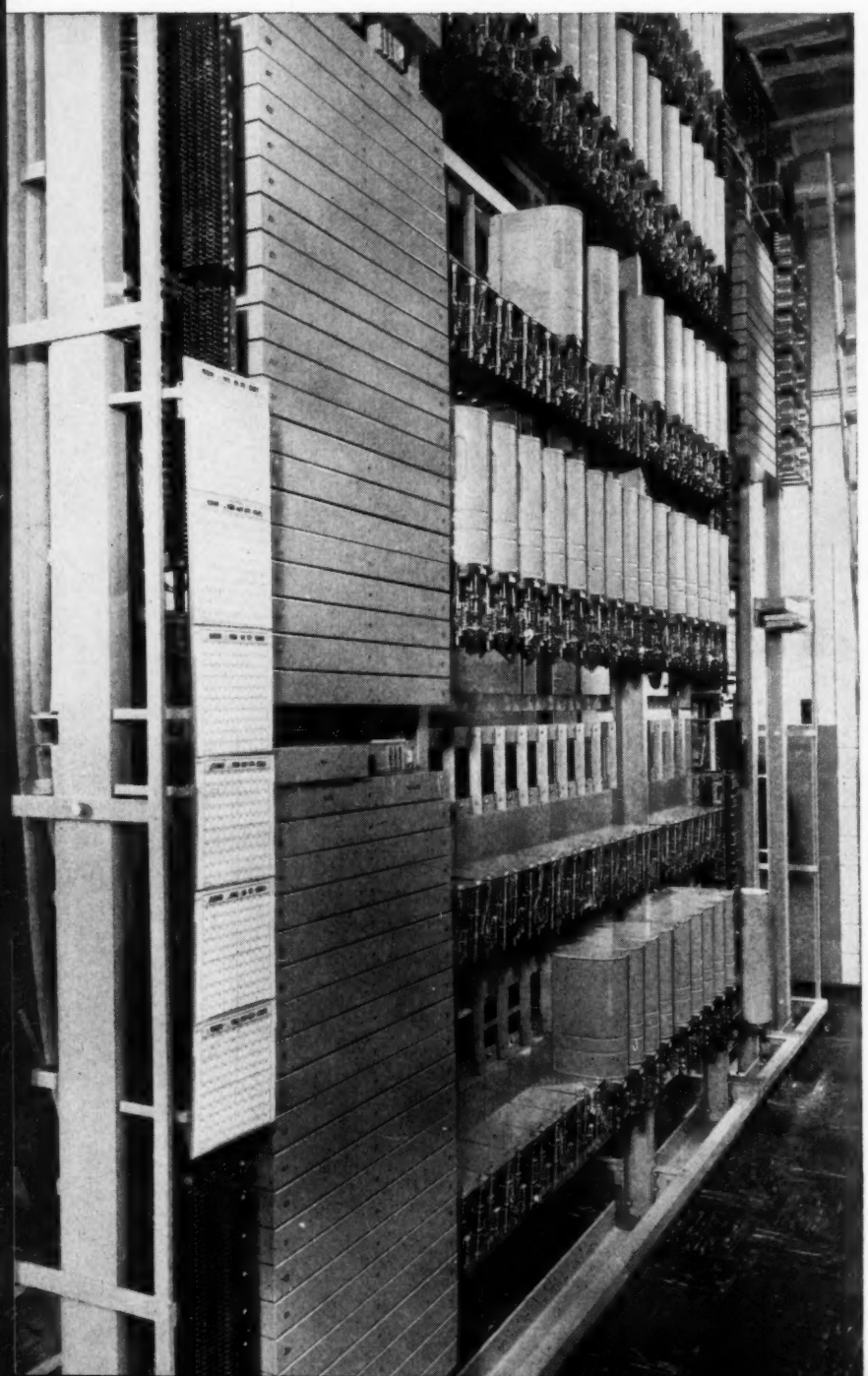
- Small size
- Mobility
- Soundproof (quietness)
- Ease of installation
- Single-party service
- Code call, if required
- Restricted service, by line marking
- Executive right-of-way
- Night trunk connections
- Two-digit numbering for stations, single digits for trunks
- Power equipment mounted within the cabinet

*Sold only as a "standard" package.*

XUM

# *These Savings are Yours*

## *with* **FEDERAL STEP-BY-STEP** *Dial Switching Equipment*



**FEDERAL'S**
**Finder Allotter System**
**Gives You More**
**with Much Less Effort!**

### MINIMUM MOTION

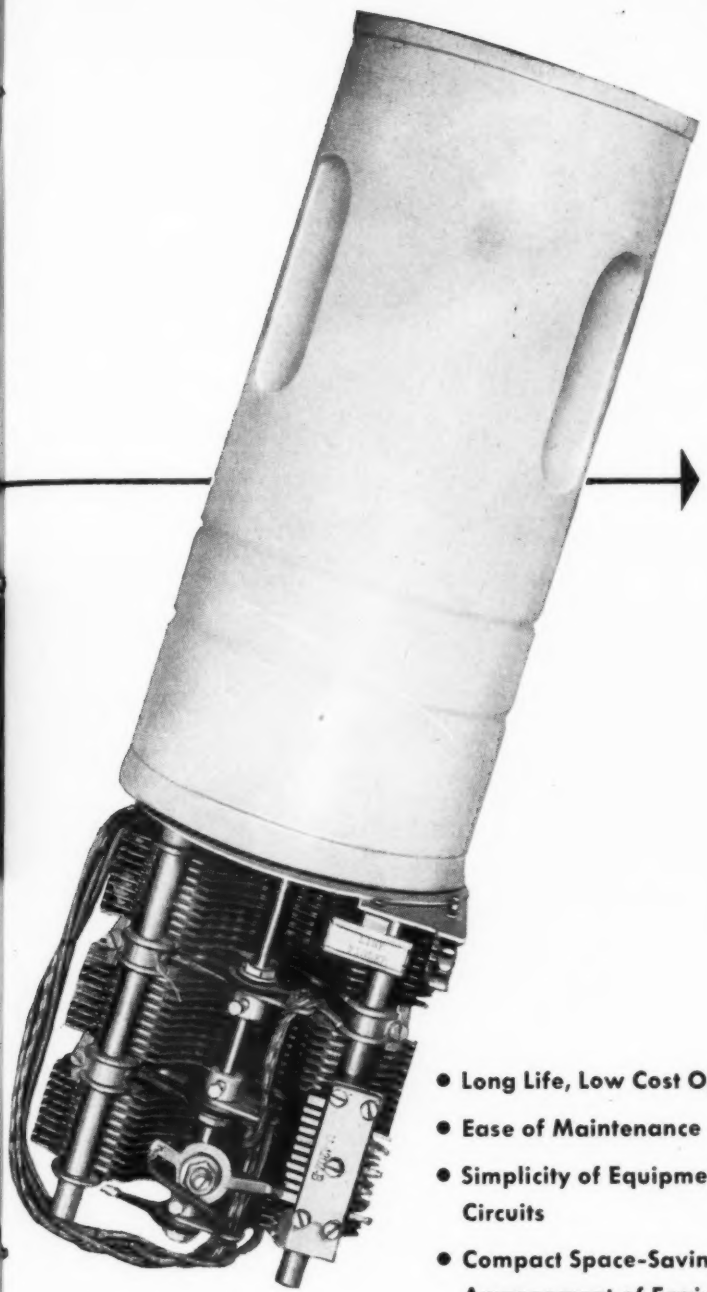
In the Federal Step-by-Step allotter system, motion of the 200 Point Line Finder Switch is reduced almost 20% over switches of other systems. The Finder requires minimum operation for selection of the line originating the call.

### SIMULTANEOUS OPERATION

200 Point Line Finder Switches can operate simultaneously to handle all traffic demands whereas in ordinary allotter systems only one finder can be in operation in any one instant.

### DELIVERY MAXIMUM SERVICE

A failure in the ordinary sequence allotter system immediately denies service to all of the lines it controls. In the Federal Step-by-Step system, a failure of the allotter system would deny service to only ten lines and all other lines would continue to be serviced without delay.



**I. T. & T. ANNUAL REPORT AVAILABLE**

If you would like to receive a copy of the International Telephone & Telegraph Corp. 1954 annual report, please write to: C. D. Manning, Vice-Pres. & Sec., Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.

***For sizeable savings . . .***

for durable dependability . . . Federal Step-by-Step is the logical choice of dial central offices of any size, or larger private automatic branch exchanges. Compact, rugged Step-by-Step offers outstanding performance combined with flexibility in arrangement of facilities to meet variable service needs. Base your decision on the facts—write today for Step-by-Step Bulletin on Community and City Exchange Services.

- **Long Life, Low Cost Operation**
- **Ease of Maintenance**
- **Simplicity of Equipment and Circuits**
- **Compact Space-Saving Arrangement of Equipment**
- **Trunking Flexibility**
- **Ready, Low-Cost Expandability for Increased Station and Traffic Requirements**

- **STEP-BY-STEP EQUIPMENT MEANS HIGH SERVICE STANDARDS**
- **MEETS GROWTH REQUIREMENTS QUICKLY AND EASILY**
- **ECONOMICAL—DEPENDABLE**
- **EACH SWITCH A SEPARATE UNIT—EASY TO CHECK AND ADJUST**
- **STEP-BY-STEP CIRCUITS ARE SIMPLE—EASY TO UNDERSTAND**
- **EFFICIENT FOR ALL SIZES AND TYPES OF SERVICE**
- **MEETS INTERTOLL DIALING REQUIREMENTS**

*Sold and Guaranteed by*

**KELLOGG** DIVISION OF IT&T

**KELLOGG SWITCHBOARD AND SUPPLY COMPANY**

*A Division of International Telephone and Telegraph Corporation*

**79 W. Monroe Street, Chicago 3, Illinois**

**KELLOGG SWITCHBOARD AND SUPPLY COMPANY**
**79 W. Monroe St., Chicago 3, Illinois**

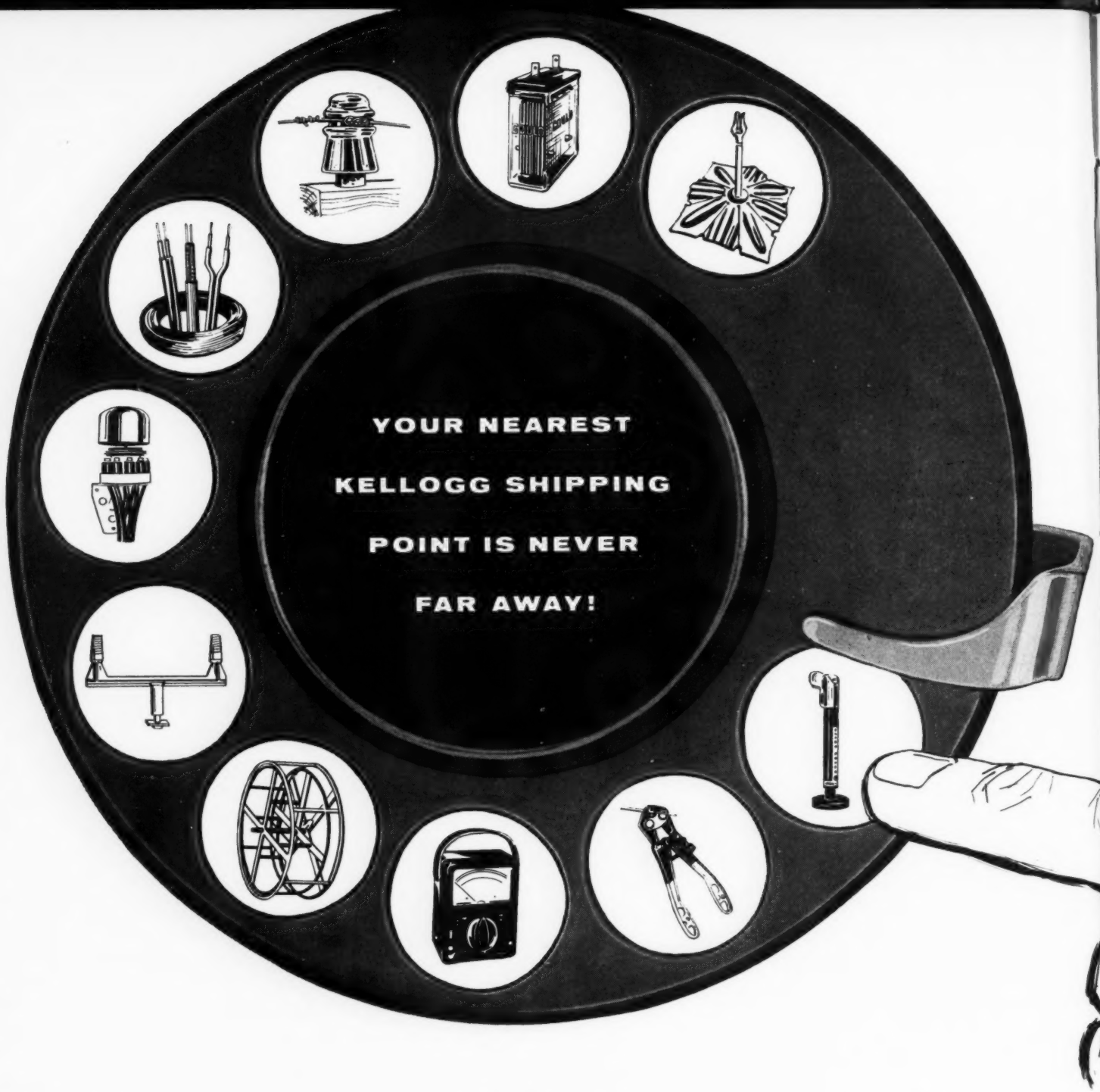
Please send full information covering Federal STEP-BY-STEP EQUIPMENT.

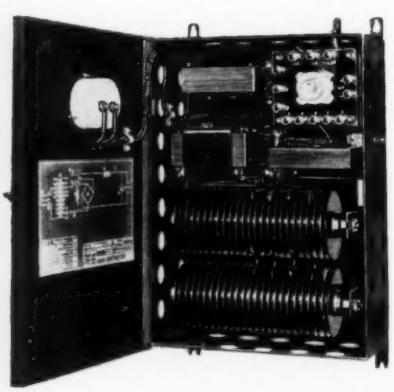
NAME_____

COMPANY_____

STREET_____

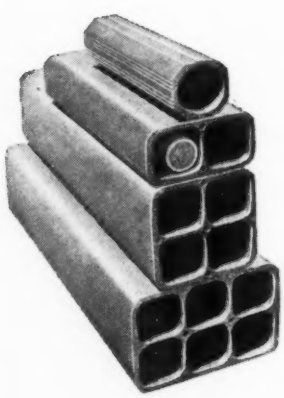
CITY_____ ZONE_____ STATE_____



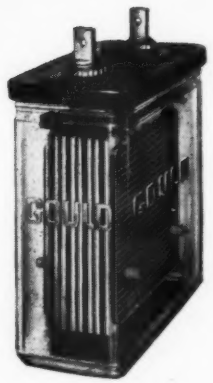



**Longer Storage Battery Life** is assured by using the RB Electrox Automatic Charger, because it maintains charging rate in proportion to drain on batteries. Humless operation permits charging while telephone system is in use. Made by SCHAUER MACHINE CORP.

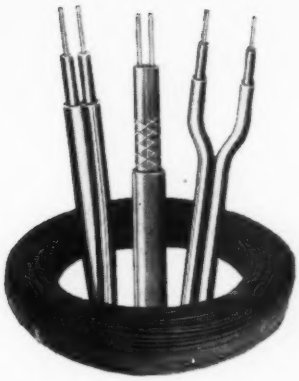
**Dead-Ends for Plastic Cable**—Specially designed for thermoplastic insulation, this type of fitting protects while firmly holding cable in elongated grip in which the unit pressure is small because of large area of gripping surface. PREFORMED LINE PRODUCTS COMPANY.



**Single and Multiple Natco Clay Conduit** for the permanent protection of underground telephone, telegraph, signal, power and lighting cables against fire, corrosion, electrolysis, mechanical injury and chemical attack. A product of NATCO CORPORATION.




**Outstanding Battery Performance** is yours when you choose Gould Planté Batteries. Thick, grooved pure lead positive plates give many years of trouble-free service! Made by GOULD-NATIONAL BATTERIES, INC., a leader in their field. They're the finest money can buy.

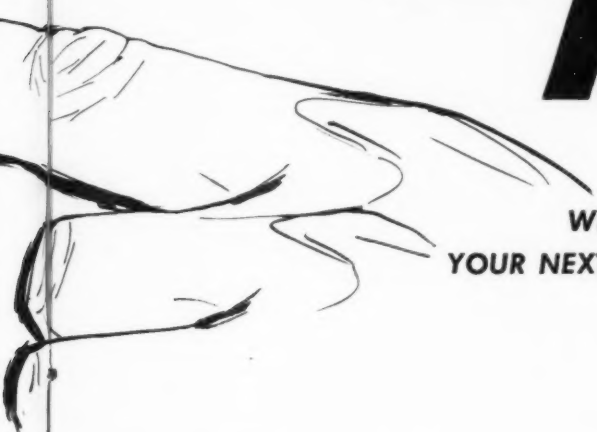


**Long Service Life and Low Plant Costs** go hand-in-hand with the installation of ENDURPRENE — The Neoprene Drop Wire available in both Copperweld and Bronze. This flexible and easy to handle wire is made by GENERAL INSULATED WIRE WORKS, INC.

**Simple and Effective!** The quick, easy positive way to dry splices in lead covered cable is to sprinkle Drierite Dessicant granules in among the conductors. This W. A. HAMMOND DRIERITE COMPANY product will not harm the sheath, conductors or insulation.

*for Guaranteed Line Supplies—*

# CALL KELLOGG



***WRITE, 'PHONE OR WIRE YOUR NEXT ORDER FOR SUPPLIES TO . . .***

**KELLOGG Branch Warehouses and Offices:**

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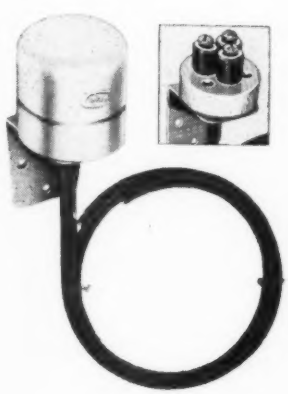
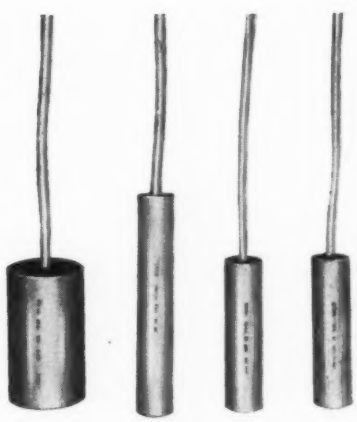


**The Cook Hy-Cap Power Cross Protector** is designed for use where there is a possibility of contact between communication circuits and power circuits. It also will furnish considerable protection from lightning damage. COOK ELECTRIC COMPANY.



**Application of Loading Coils** on telephone circuits, reduces unit loss to ⅓ or ¼ the non-loaded value—coils are designed for use on 2-wire telephone circuits in non-quadded paper insulated or plastic cable. COMMUNICATION EQUIPMENT & ENGINEERING COMPANY.

XUM

# **THIS** is what forms

## your subscriber's opinion of your company

*From the first moment your subscriber sees this Leich magneto telephone . . . he is convinced that you are giving him the very best.*

*For this Leich 900 is a trim, modern instrument. It's as compact and attractive as any your customer has ever seen.*

*Then . . . when you demonstrate the handy generator crank . . . when you show how the same telephone is a wall or desk model . . . you prove that you are going all out to bring your town the finest telephone service available.*

*The lifelike transmission and reception, the dependable ringing, even on long lines, and the trouble-free service are your guarantee of real subscriber satisfaction. For years to come.*

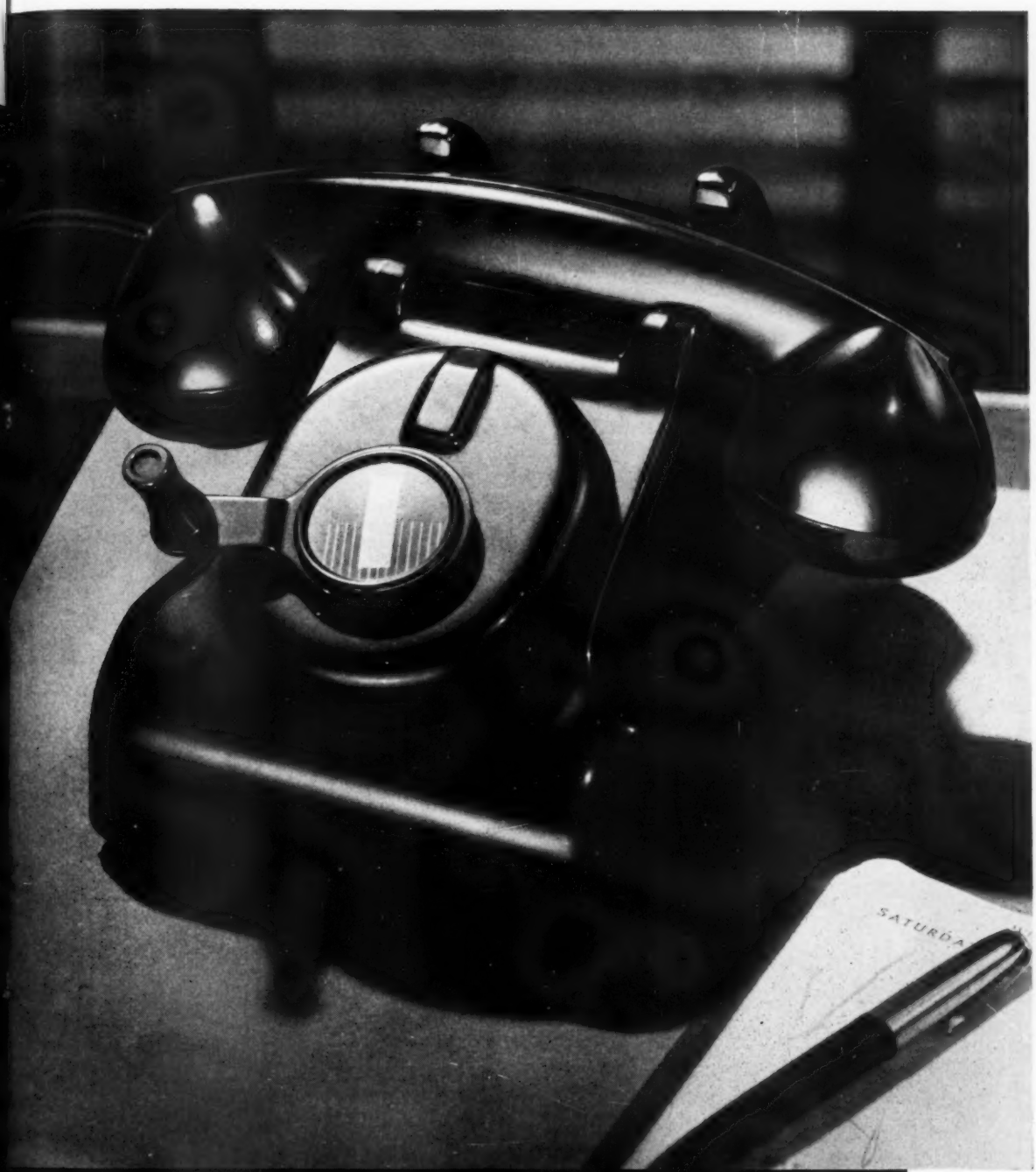
### THE LEICH 900 IS A SMART INVESTMENT FROM YOUR STANDPOINT TOO!

**SAME TELEPHONE IS WALL OR DESK MODEL.**
You can stock fewer telephones, because every instrument fits every installation requirement. You can use this Leich 900 magneto telephone for wall or desk installations without adding or changing a single thing.

**EASY TO CONVERT TO DIAL OR COMMON BATTERY**
Remove the generator, change a few spade connections and this Leich 900 becomes a regular common battery telephone. It's easy to add a dial too. Your investment in this magneto telephone is always good.

**FEWER MAINTENANCE TRIPS**
Tens of thousands of these Leich 900 magneto telephones are now in service. They have been thoroughly proved on the job. They're carefully built of the highest quality materials. Write today for complete information.

LEICH M



*LEICH 900*
*MAGNETO*
*TELEPHONE*

**MANUFACTURERS OF TELEPHONES, SWITCHBOARDS, AND RELATED APPARATUS SINCE 1907**

GENERAL SYSTEM

LEICH SALES CORPORATION, 427 W. RANDOLPH ST., CHICAGO 6, ILLINOIS
Southwest, 1227 Slocum St., Dallas 7, Tex.; Pacific Coast, 2611 Sawtelle Blvd., Los Angeles 64, Calif.

## FLASHES AND PLUGS

**FAIR WARNING.** The burglars who broke into the Michigan Electronics, Inc., plant in Chicago recently were greeted by a pleasant voice: "Good evening, gentlemen. We remind you that this place is electronically guarded. We suggest that you turn around and disappear."

There was a brief pause and the male voice, no longer pleasant, shouted: "Help, police, police! Thieves, burglars! Help, police!" Next came a woman's shrieks: "Call the police, help, help! Call the police." Then a siren wailed and alarm bells set up a loud racket.

Nearby residents summoned police but the burglars had fled.

Paul Grossi, engineer for the company, which manufactures pocket size tape recorders, said he and another engineer rigged up the device "largely as a gag." The burglary attempt was its first test.

• • •

**NATURAL QUERY.** A man called police in Columbus, O., recently, and wondered why there was no one at a branch office of the local bank.

Officers explained that Columbus banks are closed every Saturday. Then the man wanted to know—and so did police and so did bank officials—what he was doing in the bank, using the telephone.

The caller agreed to wait until police and bank officials arrived to lock the door, left unlocked since the bank closed Friday night. A quick search of the office showed nothing amiss.

• • •

**TRIED TO QUIT WHILE AHEAD.** A Clinton, S. C., truck driver was in front of the fire station when his truck caught fire. The blaze was extinguished quickly.

While he was inside the fire station telephoning the home office, the truck rolled down a grade, knocking down a mail box and a fire hydrant and crashing into an oak tree.

The town was without water for six hours while the hydrant was being repaired.

• • •

**THE SHOW MUST.** In Phenix City, Ala., after the producers of the movie *The Phenix City Story* announced that they would arrive in town to film scenes of corruption from the city's sinful past, the county sheriff, Lamar Murphy, checked all over town and found that the state's recent clean-up campaign had left Phenix City clean as the inside of an antiseptic bottle.

He hastily began telephoning to retrieve all the gambling devices he could lay his hands on for movie scenery.

### CIRCULATION

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**May 14, 1955**


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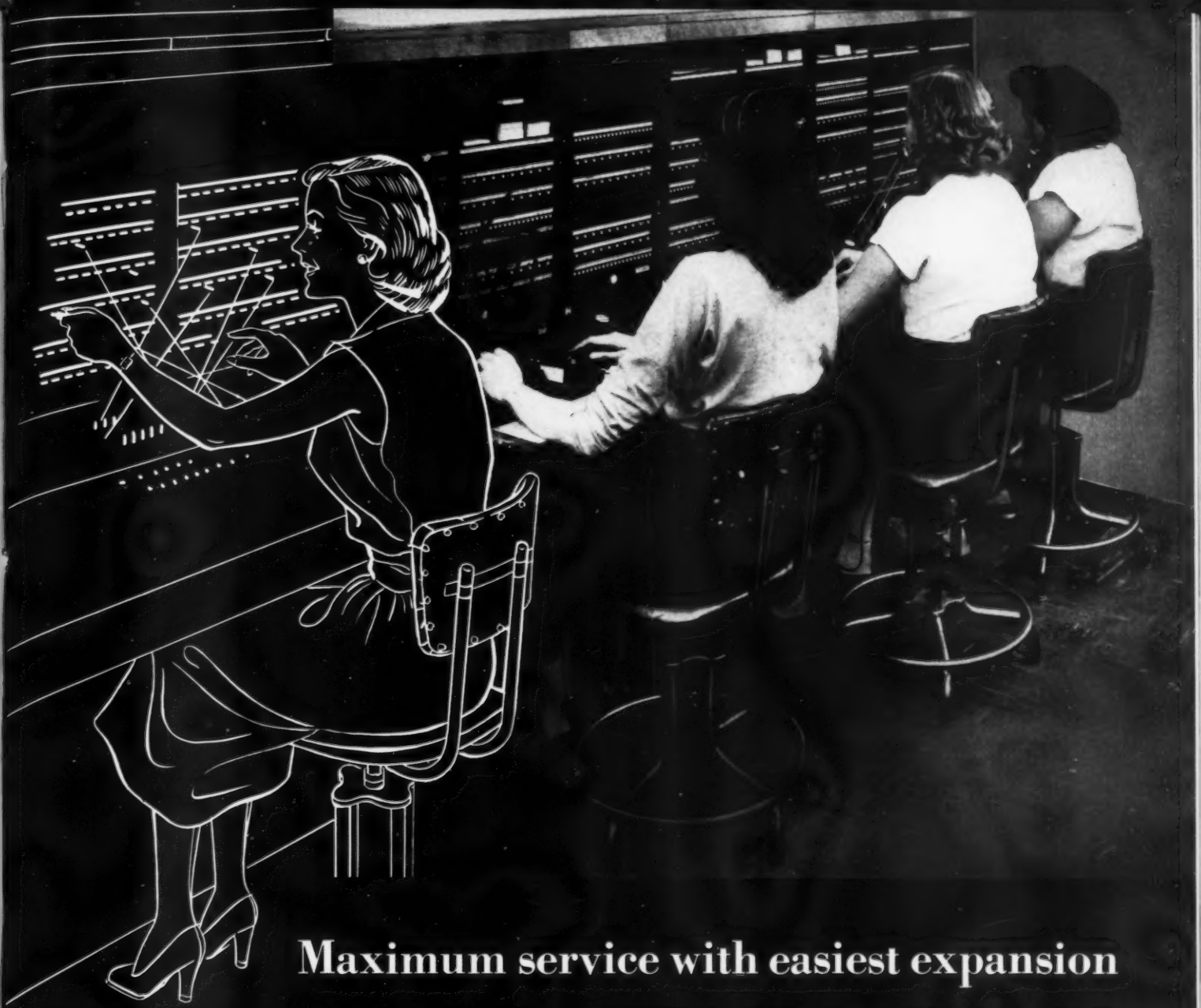


# Maximum service with easiest expansion . . . at minimum capital investment

THAT'S just one of the ingenious advantages of a Stromberg-Carlson No. 3 type Toll Board. Produced in a standard model of ONE position (with optional annex), it allows the operating company *to buy only a single position* and to make *minimum* additions whenever traffic warrants.

Add such features as Removable Jack Sleeves . . . Operator Toll Dialing . . . Keysender Operation . . . then you'll understand why progressive independents from Maine to California have investigated the field and chosen Stromberg-Carlson.

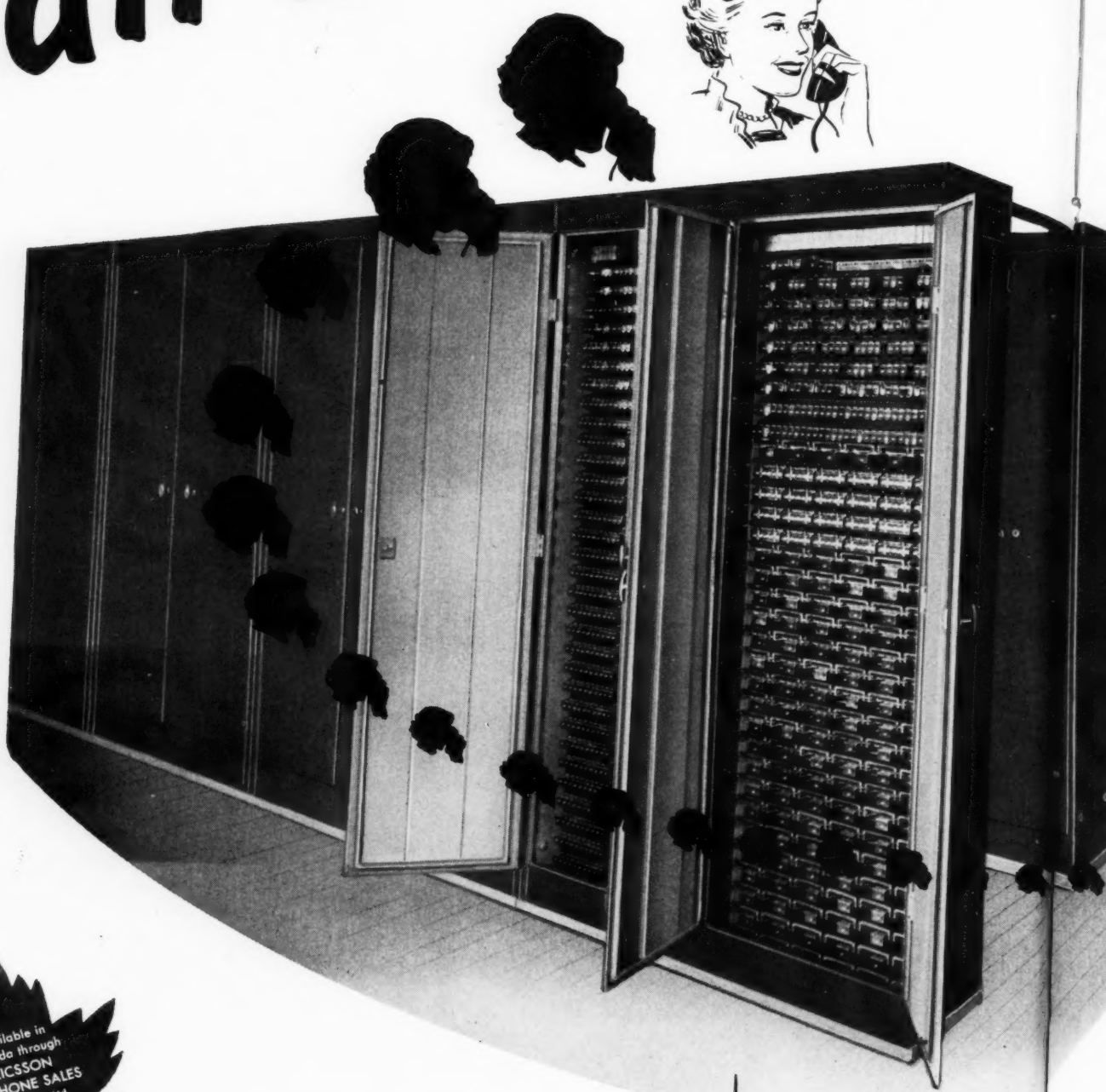
• • •

Booklet T-113 tells all about these boards and is yours for the asking. Drop a line today.

Stromberg-Carlson®

ROCHESTER 3, NEW YORK

# Call after call



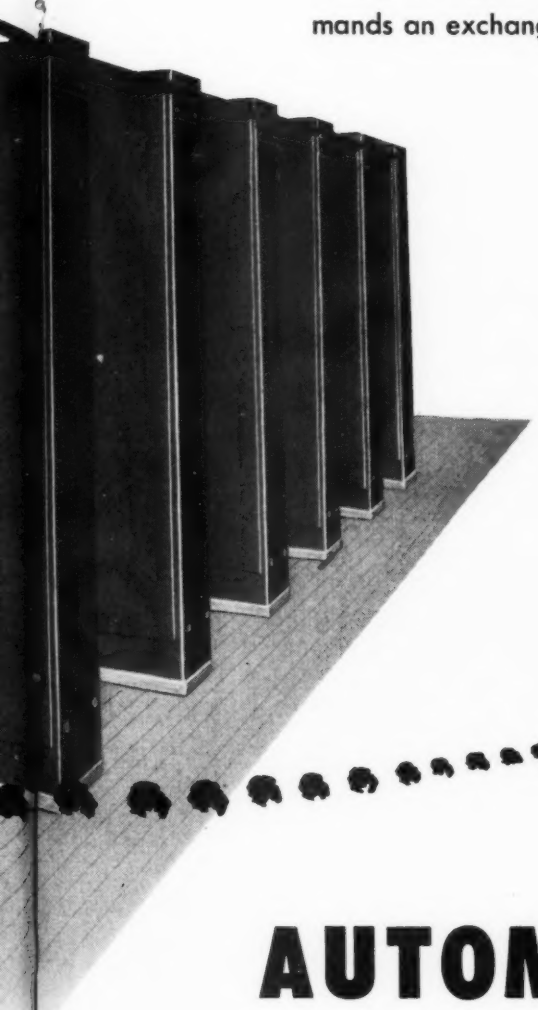
Available in Canada through ERICSSON TELEPHONE SALES of CANADA, Ltd. 1410 Stanley Street Montreal 2, P.Q.

NORTH

# ...after call....

Millions of calls for a million reasons—to the grocer, the doctor, between friends or business men, keep our telephone exchanges alive day after day, year after year with the nation's business. Which reminds us that every subscriber has a real and continuing need of the one thing that telephone companies sell—SERVICE!

Providing this dependable service on a profitable basis requires more than merely enough telephones and lines to reach all the people in your area. It demands an exchange that always provides service, with the lowest possible ratio of "lost calls."



North All-Relay Automatic Exchanges are designed to assure RELIABILITY in the commodity you sell. That's why a North system will serve your subscribers and your balance sheet with the highest ratio of completed calls and the lowest maintenance requirements.

We would appreciate the opportunity of showing you why "call after call . . . " means unit after unit of bankable revenue with

# NORTH

## *All-Relay*

# AUTOMATIC EXCHANGES

**THE NORTH ELECTRIC MANUFACTURING COMPANY**

601 South Market Street • Galion, Ohio

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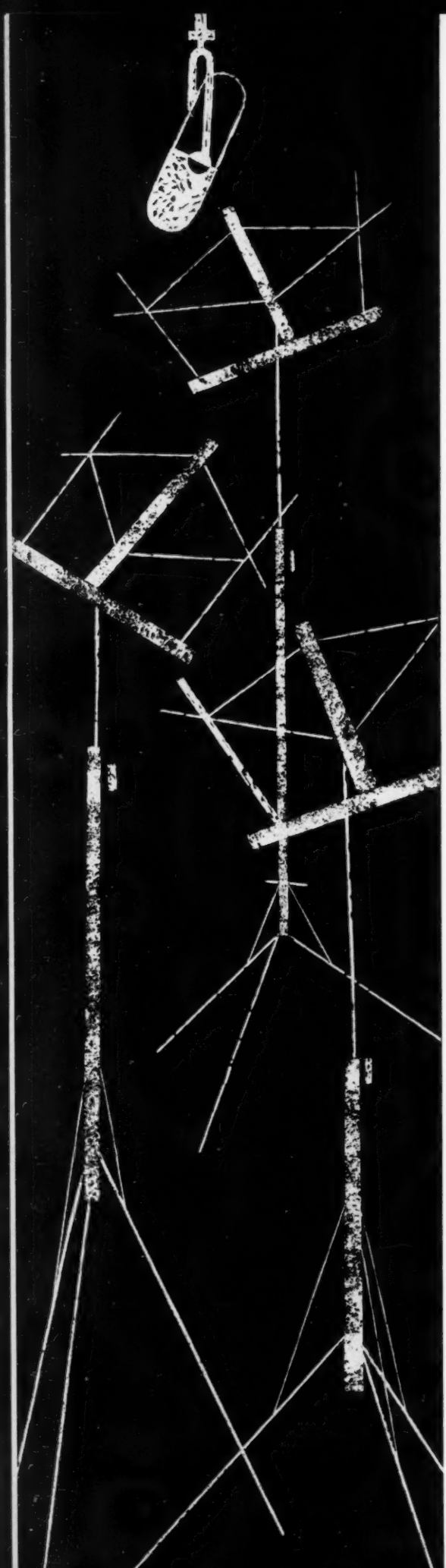


# *Setting the*

This spring, The Telephone Hour
starts its 16th year
of carrying the telephone
story direct to
America's living rooms.

With its setting of fine music
and great musical artists,
this famed radio program
is a welcome visitor
in 1½ million homes
every week . . . served by
more than 5000 telephone
companies in the nation.

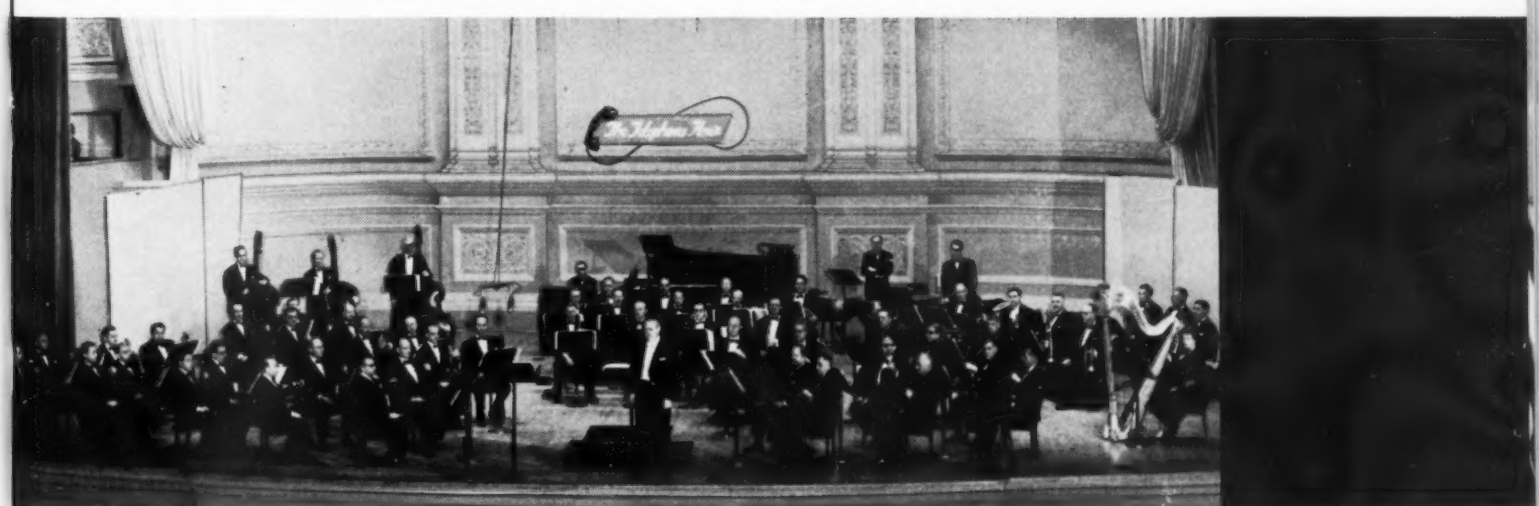
Listening is a cherished ritual
with much of the audience.
Thus, a friendly reception
is assured for the
continuing, ever-interesting
story of telephone service,
of telephone convenience,
and of telephone plans
for the future.

**Listen to the special full-hour Birthday Broadcast, May 16, on NBC radio. See your local newspaper for time and station.**

# *Telephone Story to Music...*

*Donald Voorhees, Conductor of The Bell Telephone Orchestra*

*The Bell Telephone Orchestra assembled for a broadcast on The Telephone Hour*




XUM

# Just give your name and address to Peatrophone — *and get your free sample tomorrow!*

*"This is Peatrophone mechanical answering service at Station WZAV. To get your free sample of Wonder Cream, just wait for the sound of the signal, then state your name and address clearly. Thank you."*

100 or 1,000 calls a day for premium offers don't bother Station WZAV since they discovered Peatrophone! Instead of the annoyance and confusion of constant phone answering, station personnel need only change the Peatrophone record occasionally (after over 130 calls on each side). After calling hours, a clerical worker plays back the finished records and makes up the sponsor's mailing list!

On emergency occasions the station finds Peatrophone invaluable as a talk-out machine only, for answering calls about cancelled concerts, postponed ball games, etc. On-the-spot recordings can be made to suit each situation, and Peatrophone will cheerfully give out the desired information for one hour or for 24 hours a day.

Call on your local radio stations today—point out the advantages of Peatrophone service, and you will open up a new source of revenue for your company! (And don't forget the laundries, bakeries, dry cleaners, insurance agents, theaters, and just about every business and professional office in your town.)

**Write today for complete information and literature on Peatrophone—your new source of revenue.**

***Note: Selective harmonic ringing subsets now available—all frequencies.***

**TELEPHONE ANSWERING & RECORDING CORP.**
**342 Madison Ave. New York 17, N. Y.**

nothing
sells
Telephone
Service
like
Type 80
Monophones
in exciting
two-tone
color!

**TURQUOISE**

*Harmonizes with drapes, walls, rugs, and furniture in yellow and grey.*

**SAND BEIGE**

*Provides a charming complement to decorative schemes featuring modern colors ranging from rose to pink. Beige can accompany either soft or bright colors with equal effectiveness, and is always in exceptionally good taste.*

**GARNET RED**

*A real sensation for homes, offices, stores! Adds an exciting note to interiors done in dull or somber hues, and in light pastel shades.*

**DAWN GRAY**

*Right at home with modern grey metal desks and similarly-finished furniture. Can also be used in the home to set off blonde furniture or to harmonize with dark-colored walls, drapes, and rugs.*

# Here's *Two-Tone* Type

Automatic Electric, first to offer telephones in color, now brings you another great business-builder—Type 80 Monophones in attractive *two-tone* color!

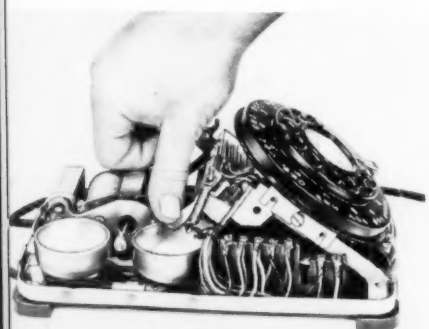
*The colors are those which research and experience prove most popular. They're smart, modern hues that will delight you and your subscribers, sell more extensions, and create valuable good will. They're different, exciting shades that catch the eye, capture faithfully the mood of a room, and accent it most effectively.*

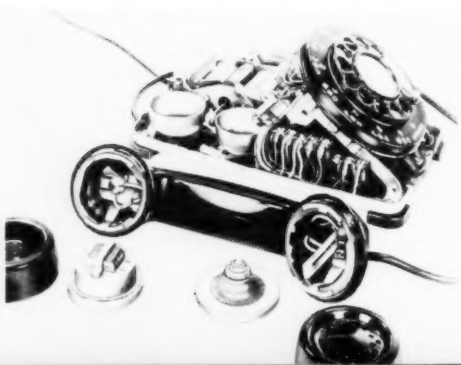
## Two-Tone Type 80's give you a

**Superior Transmission:** *New short handset, new transmitter and receiver capsules, other new transmission components give extraordinary clarity, even on long party lines.*

**Faster Installation:** *"Installer's Hooklock" keeps hook down during installation, leaves your man with both hands free. Restores itself when housing is replaced.*

**Fewer Trouble Calls:** *"Walking Handset" cannot be hung up except in the cradle—makes "off-hook" trouble calls almost a thing of the past. Rugged construction cuts maintenance.*





**CLASSIC IVORY**

*A "natural" for kitchen or bedroom. Can be used in rooms or offices finished in any color.*

# ype 80 in the colors people prefer!

Two-tone Type 80's offer simplicity and economy. When a subscriber asks for a telephone of a different color, all you do is replace the housing. It's quick and easy! Handsets, cords, dial, and mounting feet remain in lustrous black, which presents a pleasing contrast to the sparkling colored housing.

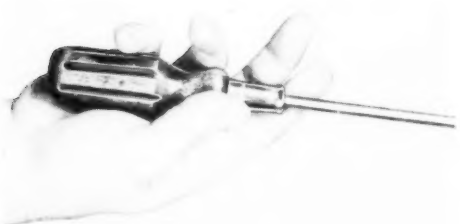
You'll be as proud to supply smartly-styled two-tone Type 80's as your subscribers will be to have them. The colors do not fade nor chip; two-tone Type 80's will stay fresh and new for years to come!

**JADE GREEN**

*A really smart color that goes well with natural and light-colored woods, and in rooms done in warm-toned colors or in other shades of green.*

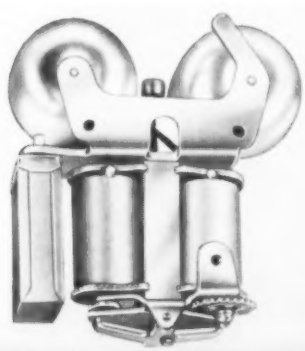
## ou all these modern features, too!

**Easier Maintenance:** *A screwdriver's all you need. Connections made with spade terminals —no soldering! Components grouped in convenient, screw-mounted units.*



**Easier, Surer Dialing:** *Slant of dial makes dialing easier from either sitting or standing position. Arrowheads guide eye from fingerplate holes to numbers—help prevent errors.*

**Improved Ringing:** *Considerably increased volume of sound provided at higher ringing frequencies. Volume control available for SL ringer. Gongs pitched to give sound that carries well.*



## use this handy system to order

# Type 80 Monophones

*in popular two-tone colors*

GARNET RED

TURQUOISE

SAND BEIGE

DAWN GRAY

CLASSIC IVORY

JADE GREEN

By going through the five simple steps in the table at the right, you can find the correct stock number for any two-tone Type 80 Monophone quickly, easily, and accurately.

**FOR EXAMPLE**—let's say you want a standard Type 80 Monophone, without hooklatch, but with straight Neoprene cord, in two-tone beige color, with metropolitan dial, and with straight-line ringer less adjustment wheel. Starting with step #1 in Column A, find the "without hooklatch" specification in Column B; then find the corresponding code number in Column C (N-82"). Continue with steps 2, 3, 4, and 5, until you have a complete stock number, including color specification (N–82/0/20-C/SL). This number would be written on your order as:

N-82020—CSL

**NOTE:** The number shown above is presented only as an example. Other numbers, for instance, could be N-82122-B54, N-83224-CSA, and so on. All items shown in the table are available.

| A | B | C |
|---|---|---|
| **Step 1:** *Decide whether or not you want hooklatch* | Standard Type 80 Monophone in two-tone color, *without* hooklatch | N-82 |
| | Standard Type 80 Monophone in two-tone color, *with* hooklatch | N-83 |
| **Step 2:** *Choose the type of cord you want* | Straight Neoprene Cord | 0 |
| | Extensicord | 1 |
| | Koiled Kord | 2 |
| **Step 3:** *Choose the housing color you want* (Dial, handset, cord, and mounting feet remain black.) | Sand Beige | 20 |
| | Dawn Gray | 21 |
| | Jade Green | 22 |
| | Classic Ivory | 23 |
| | Garnet Red | 24 |
| | Turquoise | 25 |
| **Step 4:** *Select the type of dial* you need* | Dial with 1-0 number plate | -A |
| | No dial (with dial blank only) | -B |
| | Dial with ABC (metropolitan) number plate | -C |
| **Step 5:** *Specify type of ringer you require* | Straight-line, less adjustment wheel | SL |
| | Straight-line, with adjustment wheel | SA |
| | 16.6-cycle harmonic | 16 |
| | 20-cycle harmonic or decimonic | 20 |
| | 25-cycle harmonic | 25 |
| | 30-cycle harmonic or decimonic | 30 |
| | 33.3-cycle harmonic | 33 |
| | 40-cycle decimonic | 40 |
| | 42-cycle harmonic | 42 |
| | 50-cycle harmonic only | 50 |
| | 50-cycle decimonic only | 51 |
| | 54-cycle harmonic | 54 |
| | 60-cycle decimonic | 60 |
| | 66-cycle harmonic | 66 |
| | 66-6-cycle harmonic | 67 |
| | Ringer with vacuum tube for superimposed ringing | VT |

If you have black Type 80 Monophones, you can convert them to two-tone telephones. Four screws, a few seconds—and the job is done.

**ORDER HOUSINGS ONLY**

| Description | Color | Cat. No. |
|---|---|---|
| Housing Only | Garnet Red | HO-24 |
| Housing Only | Turquoise | HO-25 |
| Housing Only | Sand Beige | HO-20 |
| Housing Only | Dawn Gray | HO-21 |
| Housing Only | Classic Ivory | HO-23 |
| Housing Only | Jade Green | HO-22 |

*In addition to the dials listed above, "station-identity" dials for use with Types A and B Strowger Automatic Toll Ticketing Systems are also available. Write for full information. *Address: Automatic Electric Sales Corporation, 1033 W. Van Buren St., Chicago 7, or call HAymarket 1-4300.*

AUTOMATIC ELECTRIC

CIRCULAR No. 1853 PRINTED IN U.S.A. 33,500 4-23-55

# ★ ★ ★ IN THE ★ ★ ★ NATION'S CAPITAL

by FRANCIS X. WELCH — WASHINGTON EDITOR

**Clyde McFarlin testifies for Independents on Wage-Hour exemption for small exchanges. Union will have to answer to the public for violence in Southern Bell strike. Virginia Commission rules local gross receipts tax should be passed on to subscribers.**

IT NOW LOOKS as though small telephone companies are facing an uphill fight in the Senate to preserve the exemption in the present Wage-Hour Law covering operators' wages at exchanges of 750 stations or less. A Senate Labor Sub-Committee, headed by Senator Douglas (D., Ill.), on May 3, heard a witness for the United States Independent Telephone Association (USITA) defend the continuation of the existing statutory exemption. But both Secretary of Labor Mitchell and the CIO telephone union (CWA) president have asked that the exemption be reviewed. The outlook for increasing the minimum from the present 75-cent an hour still hovers between 90 cents (recommended by the President) and $1.00 as far as committee action is concerned.

If the Senate committee, followed by Senate floor vote should remove the small exchange telephone operators' exemption there is still the House Labor Committee to be reckoned with. House Chairman Barden (D., N. C.) has previously indicated that he is not disposed to go into the matter of changing the present exemptions in the Fair Labor Standards Act. With the support of the House Rules Committee and the House leadership, and action by the Senate to change or remove, the exemption might be yet blocked.

The witness for USITA was Clyde McFarlin, president of the Montezuma (Ia.) Mutual Telephone Co. He turned in an excellent performance in defense of the small telephone companies and their right to retain their present small exchange exemption. Senator Douglas became so interested in McFarlin's testimony that he engaged him in conversation for a half-hour instead of the scheduled 10 minutes. In the course of his questioning Senator Douglas indicated the possibility of a compromise which would limit the exemption to small companies rather than small exchanges. What will come of this idea, if anything, remains to be seen.

McFarlin pitched his arguments against "tampering with our 750-station exchange exemptions" on three points:

(1) Injury to the telephone subscriber.

(2) Injury to the small telephone companies.

(3) Injury to small telephone company employment.

On the first point McFarlin recalled that the income of telephone companies is derived entirely from compensation paid by subscribers for telephone service. The rates charged subscribers, therefore, are fixed by operating costs and a fair rate of return upon capital investment. There is no way for a telephone company to absorb any of the costs of a wage increase by mass production except by reducing its return on capital. The number of operators required is determined by the volume of calls handled. Therefore, an increase in the local calling rate increases operating costs without any corresponding increase in income.

Due to the increase in wages and higher costs of telephone equipment, taxes and other costs, McFarlin said it has been necessary for all telephone companies to increase their subscriber rates, some of them several times since the end of the war. Referring to labor union testimony to the effect that if companies require an increase in their rates in order to pay these increased wages, a state regulatory commission would be required to approve their application, the USITA witness said that "regulatory bodies are becoming most reluctant to grant any increase in rates."

On the second point, McFarlin emphasized the fact that a wage increase hits telephone companies three times a day, and there is no way by which the companies can escape this burden because they operate on three eight-hour shifts. An increase of 25 cents an hour in the minimum hourly rate paid operators means that all operators must be paid an increase of that amount or more. There are differentials in the operator hourly rates based on seniorities, skill and other factors. An increase, therefore, in the minimum hourly rate from 75 cents to a dollar an hour would mean an increase of at least 25 per cent in the total operators' payroll. It may indeed be even more than that, because of increases in wages of still other employes made necessary in order to preserve differentials among the several employe classifications.

In addition to the burden imposed on telephone companies by an increased minimum hourly rate, due to the fact that it hits the companies three times a day, there is an additional burden due to the fact that wages account for such a high percentage of the operating costs of telephone companies. William E. Robey, senior engineer of the Indiana Public Service Commission was quoted as saying: "As we all know, wages account for a higher percentage of operating costs in the telephone business than in most others." Wages of telephone companies run from 65 to 80 per cent of operating expenses, as contrasted with approximately 50 per cent for railroads and 30 per cent for electric utilities.

McFarlin compared the earnings of small (Class C) Independent telephone companies ($30 to $50) with Bell System earnings per telephone (from $102.49) and suggested that the smaller companies are not able to bear addi-

tional expenses of operation which would require rates higher than their subscribers are willing to pay. He concluded:

"I would not be candid with you if I did not tell you that many of the small telephone exchanges having 500 stations or less cannot continue to operate indefinitely without converting to dial. Increased wage and material costs, even if the exemption is preserved, make it impossible for many exchanges to continue indefinitely to operate as manual exchanges. There has already been a marked increase in the number of manual exchanges being converted to dial each year."

### Big Union Responsibility

It now seems as certain as such things can be, that the AFL and CIO are going to be married in proper style and fashion. Whether these two powerful union groups will live together happily ever after remains to be seen. But we have no contrary evidence at the moment, other than vague rumors and a couple of scowling eyebrows otherwise known as John L. Lewis. It is interesting to note that a good deal of disinterested editorial and other comment, about this "union of unions," has bracketed the merger event with pending labor disturbances, including the Southern Bell Telephone strike.

While these are two entirely independent matters, the editors and columnists have pointed to a golden link between them—in the form of a recent CIO loan of $1,250,000 to the Southern telephone unions, plus a previous "anonymous" donation of $500,000 to the striking CWA unions. (By the way, how does one go about sending, or receiving, a half million dollar "anonymous" donation?)

There is an obvious connection, of course, between "big time" union consolidation and "big time" financing of regional and local union activities. The implication, in this case, is that the Southern Bell strike has now grown, in meaningful impact, beyond the confines of Southern Bell's territory. Nobody, whether it is a union or a bank, invests over 1 million dollars in a local or regional enterprise without establishing some pretty definite controls for the protection of that investment This may mean that the control of Southern Bell's strike—if it remains unsettled much longer — may extend beyond even the top brass leadership of the CIO Communications Workers of America.

When the AFL-CIO merger is finally consummated the united outfits will number some 15 million working men. In a country where there are 63 million people in the civilian labor force (including millions of agricultural, self-employed, management and other workers not ordinarily subject to union organization of their own), the extent of this union membership is not to be exaggerated nor dismissed lightly. For the 15 million AFL-CIO people will be concentrated in the basic industries on which the national community depends.

They may use that power along the line already patterned in the Southern telephone strike. There, the business of several states has been seriously affected. The issue is said to go beyond the usual union demands. The Southern telephone strike aims at new status for unionism in the South. The work stoppage takes on political and social overtones, in addition to its straight-out economic meaning.

CIO workers in other lines and in other parts of the country are being drawn into the support of this concentrated pressure in the South. A million and a quarter dollars in a single

*(Please turn to page 40)*

## REA APPROVES LOANS IN GEORGIA & KENTUCKY

**The REA approved two loans totaling $735,000 for improving and extending telephone service in rural areas of Georgia and Kentucky, the U. S. Department of Agriculture announced on Apr. 24. Details of the two loans follow:**

**Progressive Rural Telephone Cooperative, Inc., Dudley, Ga., on Apr. 25 received an allocation of $464,000, which will be used to provide area-wide rural telephone service in Bleckly, Dodge and Laurens counties.**

**The newly organized cooperative plans to use its own funds plus the REA loan to provide modern dial telephones for 860 subscribers in its service area.**

**The following acquisitions will serve as a nucleus for the new system: Kennedy Telephone Co. at Dexter, the Chester Telephone Co. and the Rentz and the Cadwell exchanges from the Maddox Telephone Co.**

**These telephone properties are now furnishing magneto service to 153 subscribers over 46 miles of line. About 256 miles of new line will be added, 39 miles of line rebuilt and new dial central offices constructed at Cadwell, Cedar Grove, Chester, Dexter and Rentz.**

**The rehabilitation and new construction will make it possible for the Progressive cooperative to improve service for the existing subscribers and to serve 707 rural families now without telephones.**

**Present plans include service without toll charge among the Cadwell, Dexter & Rentz exchange areas, and also between the Cedar Grove and Rentz areas.**

**C. J. Burch is president of the Progressive cooperative.**

* * *

**Brandenburg (Ky.) Telephone Co. on Apr. 27 received a loan of $271,000, fourth loan to this borrower.**

**The company plans to use these funds to furnish modern service to 610 subscribers in an expanded service area in and around Irvington and Custer in Breckinridge County.**

**As a nucleus for the new service, the borrower will acquire the Irvington Telephone Co., serving 215 subscribers including 74 switchers owning their own facilities.**

**New automatic central offices will be constructed at Irvington and Custer. About 23 miles of the existing line will be rebuilt, and 117 miles of new line and other facilities added to improve the service for the existing subscribers and to serve 395 rural families in the area now without telephones.**

**The four REA loans, totaling $1,020,000, will make it possible for the Brandenburg company to serve 1,759 subscribers over 428 miles of line in Breckinridge and Meade counties. Automatic central offices at Battletown, Brandenburg, North Garrett and Payneville are already in service.**

**About 600 subscribers are now receiving dial service in the operating area. Present plans include service without toll charge among the six exchange areas.**

**L. G. Hessler, Sr., is president of the Brandenburg company.**

# Utility Earnings Requirements

**By EUGENE S. MERRILL***

THE SUBJECT of "Utility Earnings Requirements" is not a new one. It has been discussed in countless articles, speeches and round tables, and has formed a major part of rate hearings from coast to coast in recent years. The fact that the subject is considered worthy of further discussion at a meeting such as this is indicative of its importance and of the wide disagreement that exists as to what constitutes the earnings requirements of a utility under present conditions.

The determination of the earnings requirements of a public utility company is not a simple matter. The courts of the country have not considered it so—a whole literature on the subject has developed over the years from the decisions of various courts, including the Supreme Court of the United States. While tests and guideposts have been developed by the courts which utility companies and public utility commissions attempt to follow, there is enough conflict and ambiguity in the court decisions so that constant disagreement as to principles arises in most rate proceedings. While a single commission may for a while define requirements in definite terms, the fact that there are such wide differences of opinion between commissions is further indication of the complexity of the problem. Even the utility companies do not agree as to the earnings they require. While they all agree that more earnings are needed under present day conditions, there is considerable disagreement as to how to measure the earnings required. Some companies will emphasize the need for more adequate depreciation allowances to take care of replacements at inflated price levels; other companies will insist on a rate base calculated on reproduction value; others will insist on earnings sufficient to keep the price of the common stock a given percentage above book value; and still others will insist on a rate of return somewhat commensurate with that being earned by non-regulated industry. This lack of uniformity adds to the complexity of rate proceedings.

In view of these many complexities and the disagreement between authorities, it is only natural that all parties involved in rate controversies should seek a simple and easily applicable method of determining the earnings requirements of a utility company. The utility companies would like a simple method of determining earnings requirements so as to shorten the proceedings and to cut down the delay in obtaining the rate increases requested. The public utility commissions, working as they are with limited staffs and under a tremendous work load, would welcome any method that would shorten proceedings and produce fair answers quickly.

The desire for a simple, straightforward, mathematical method of determining earings requirements of utilities has given rise to the popularity of the application of so-called "cost of money" to an investment original cost rate base. Among the reasons for the popularity of the "cost of money" approach are the following:

(1) The term "cost of money" has a straightforward practical sound.

(2) What purports to be "cost of money" may be computed from figures obtained from the books of account of the utility and from market quotations derived from actual transactions of the company's and other utilities' securities.

(3) Computation of so-called "cost of money" is a simple matter, requiring little more than addition of bond yields or costs, preferred stock yields or costs, and earnings-price ratios.

Of course, those of you who have heard economists, investment analysts, and other experts hold forth on such subjects as pressure, imbedded costs, spot ratios, optimum capitalizations, and payout ratios, may not consider the approach such a simple one. These complexities, however, are seldom introduced by the "cost of money" expert—it seems to be always the objector to the simple mathematics who introduces the complexities in order to adjust the "cost of money" figure up or down.

The utility companies are themselves responsible to some extent for the popularity of the "cost of money" approach to rate of return. In the late 1930's and early 1940's, a number of utility companies used "cost of money" calculations as a measure of their required rate of return. The stocks of such companies were depressed at the time for one reason or another, and the earnings-price ratios used in the calculation of "cost of money" gave a resulting figure which was satisfactory to the utility companies as a rate of return.

In almost every rate proceeding since then, studies have been presented on "cost of money." In this regard, the Federal Power Commission last year in order No. 165, required natural gas companies proposing major rate changes to submit data on "cost of money," including debt capital, pre-

*Mr. Merrill is executive vice president of Standard Research Consultants of New York City. He delivered this address at a 1954 meeting of New Jersey Utilities Association.

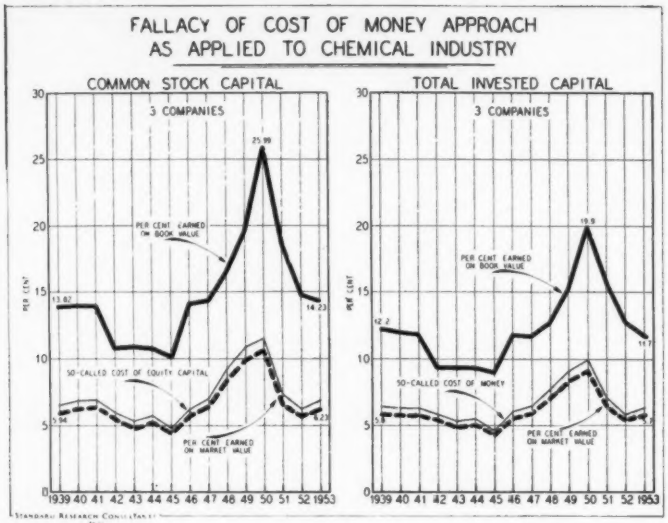

FALLACY OF COST OF MONEY APPROACH
AS APPLIED TO CHEMICAL INDUSTRY
COMMON STOCK CAPITAL
3 COMPANIES
TOTAL INVESTED CAPITAL
3 COMPANIES
PER CENT EARNED ON BOOK VALUE
SO-CALLED COST OF EQUITY CAPITAL
PER CENT EARNED ON MARKET VALUE
SO-CALLED COST OF MONEY
PER CENT
1939 40 41 42 43 44 45 46 47 48 49 50 51 52 1953

Chart I

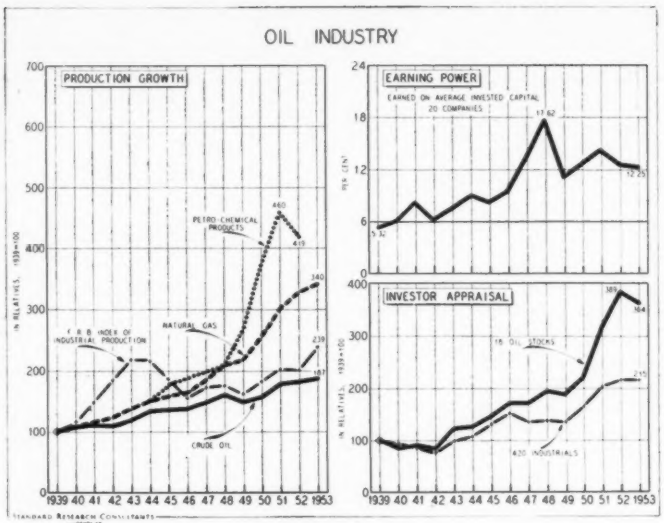



Chart II

ferred stock capital, and common stock capital. Specifically required are computations on earnings-price ratios.

The stocks of many companies in the rapidly growing natural gas industry are selling high in relation to current earnings. Such companies, of course, contend that the "cost of money" computed on the basis of low earnings-price ratios has no significance as a guide to rate of return and utility earnings requirements. A few natural gas companies, however, whose stocks are selling low in relation to earnings, welcome the "cost of money" figure computed under the requirements of the Federal Power Commission. . . . But, for such companies, the commission staff contends there must be adjustments made because of low dividend payout or other reasons.

The fact that within the same industry the "cost of money" approach gives an answer for one company that is considered satisfactory by the commission staff and too low by the company, and that the same approach gives an answer for another company that is considered satisfactory by the company and too high by the commission staff, suggests that the approach may be fallacious.

As "cost of money" is an easy approach to rate of return so also is book investment based on original cost an easy approach to rate base. When the book figures are accepted, there is no need for lengthy studies on reproduction value, observed depreciation, and trended costs. Original cost became popular in regulatory circles during the 1930's largely for accounting and financial reasons. The excess valuation above original cost on the books of account of utility companies stemmed largely from the rapid acquisitions and mergers in the early developmental days. Reproduction value as a concept in rate-making fell into disrepute. This had little effect then as reproduction value differed little from original cost. When inflation came with the war and the postwar boom, the concept of reproduction value was suspect at the very time when it was needed for the determination of utility earnings requirements.

The complexity of reproduction value studies in the past and the frequent insistence by valuation engineers on reproducing every item of the physical plant inventory irritated public utility commissions and caused many commissioners to believe that the whole process was a kind of legal-engineering hocus-pocus. I have in mind a railroad reproduction value study made many years ago in which one of the valuation engineers was called upon in the course of the study to determine the present value of a small outbuilding at a wayside station. For some reason, this small building had been built of mahogany—probably because a few pieces of this valuable lumber had been available from some stray shipment many years before. Reproduction value meant reproduction value literally to this valuation engineer and so this outhouse was reproduced new in mahogany on the valuation study.

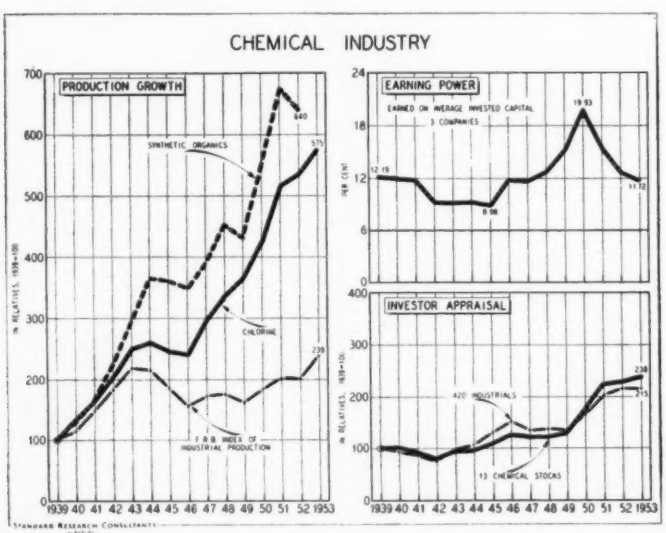



Chart III

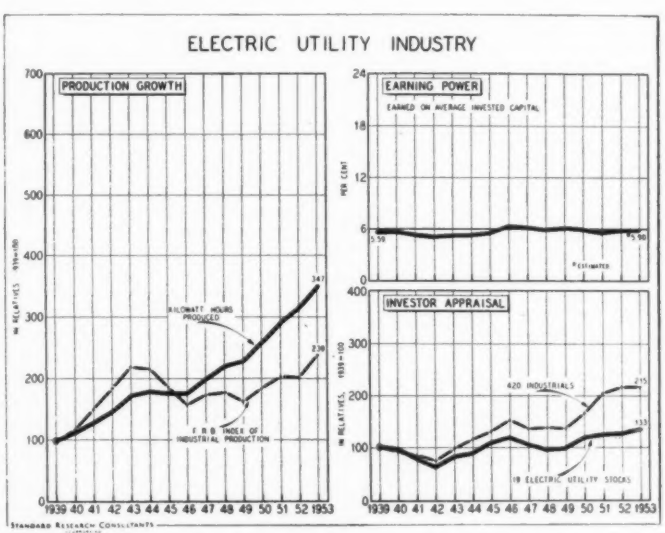

ELECTRIC UTILITY INDUSTRY
PRODUCTION GROWTH
KILOWATT HOURS PRODUCED
F R B INDEX OF INDUSTRIAL PRODUCTION
EARNING POWER
EARNED ON AVERAGE INVESTED CAPITAL
INVESTOR APPRAISAL
420 INDUSTRIALS
19 ELECTRIC UTILITY STOCKS
PER CENT
1939 40 41 42 43 44 45 46 47 48 49 50 51 52 1953

Chart IV

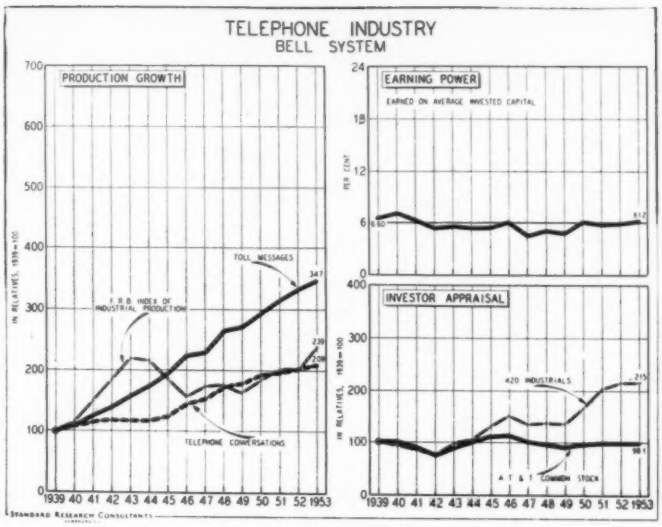



Chart V

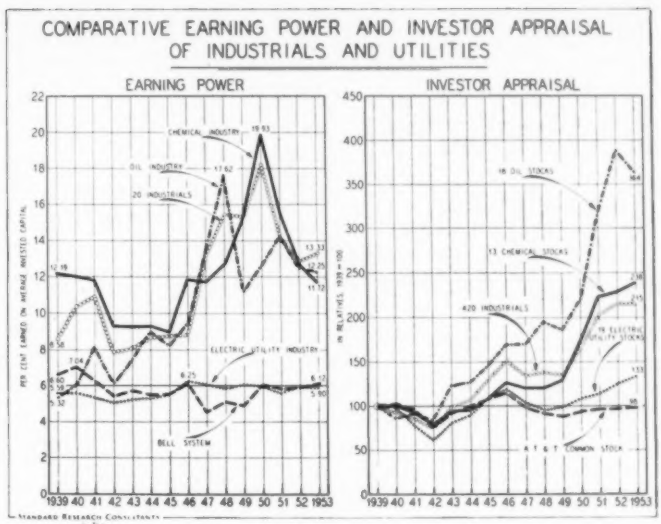



Chart VI

More recently, I read of a reproduction value study of an electric utility company involving the cost of tree trimming and clearing of a right-of-way for a transmission line. The engineer, in addition to making necessary adjustments for present-day wages for tree trimmers, made a further adjustment because the trees would have been larger as of the present and, therefore, have required more hours to trim. Instances of this kind in no way disprove the validity of reproduction value as a concept in rate-making. But they have done much to bring the concept into disfavor.

The fact that original cost figures may be taken directly from the books of account is no reason for basing value or earnings requirements on them. In all other branches of the economy, neither buyers nor sellers pay much attention to the cost of properties in arriving at a sales price except for accounting and tax purposes. A man selling a house does not accept book cost because of the complexity of determining reproduction value. I believe that regulation should take reproduction cost into consideration in determining utility earnings requirements. I recommend that utility companies present data on the subject in as simple and straightforward manner as possible.

The weakness of the "cost of money" approach as a guide to rate of return is generally recognized even by those who support its use. For example, it is generally recognized that a common stock will tend to sell higher in relation to earnings the larger the dividend payout. This means the higher the payout, the lower the earnings-price ratio. If the earnings-price ratio is accepted as a cost of equity money, it indicates that the utility with the least conservative dividend policy has the lowest "cost of money." Also, studies will show that the sum of the borrowing costs and of the earnings-price ratios of a heavily indebted company will usually be lower than the sum of the borrowing costs and earnings-price ratio of a conservatively indebted company. Thus, if these figures are accepted as "cost of money" and a guide to rate of return, the paradoxical situation arises that the company following the least conservative dividend and financial policies is shown to have lowest "cost of money" and, therefore, should be held to a lower rate of return than a more prudent company. A commission accepting such "cost of money" evidence may be placed in a position of encouraging imprudent utility financing. Such a position is, of course, untenable, and it suggests that the concept may be invalid.

Disagreement over "cost of money" largely centers on equity capital. There is no important disagreement on the cost of bond capital and preferred capital except as to what part of total capital should be represented by each. The starting and ending point for the computation of cost of equity money in most "cost of money" studies is the computation of the earnings-price ratio. It is an easy enough matter to divide the earnings per share by market price per share to compute the earnings-price ratio. While disagreements often arise as to whether a single earnings-price ratio should be used or averages covering a period of years, the major disagreement arises as to whether the quotient ever represents cost of equity capital. It is my own belief that the earnings-price ratio seldom if ever measures equity cost in a growing industry. Or to state it in a different way, I believe that the whole concept of cost of equity money may be a false one.

For industrial common stocks, the concept of "cost of money" seems to have no meaning. For example, the common stock of Allied Chemical & Dye has earned $4.60 a share on average in the past five years and has sold at an average price of $63 a share —an average earnings-price ratio of 7.3 per cent. During this same period, this growing chemical company has earned 15.7 per cent on the book value of the common stock. What has been this company's cost of equity money? Is it the 7.3% average earnings-price ratio, which is the basis for most "cost of money" computations in the utility field? Suppose that the chemical industry were declared to be a utility. The stock, of course, would decline in the market if the rate of return were fixed on the basis of earnings-price ratio, for that would mean the end of the level of earnings that caused the high price of the stock. No, the earnings-price ratio of 7.3 per cent is not the cost of equity capital for Allied Chemical & Dye.

On the other hand, it cannot be contended that the cost of equity capital is the 15.7 per cent actually earned on the book investment, for that would seem to indicate that the more a company earns the more its capital costs. I think what this illustration indicates is that it is difficult, if not impossible, to apply the concept of "cost of money" to equity capital. It also brings out the fact that to the extent that earnings-price ratios are used as a guide to rate of return, they must be applied not to book investment but to market value of the investment. Chart I further illustrates the fallacy of "cost of money" as applied to the chemical industry. This chart shows the earnings on equity capital and total capital at book and market for three companies.

The emphasis on the "cost of money" concept in recent years has diverted attention from an approach to the determination of utility earnings require-



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ments which I believe offers a more reliable guide to the earnings requirements of a public utility and which squares with the fundamental concept of public utility regulation. This is the approach suggested by the Supreme Court in the Bluefield Case—the relative risk approach.

It must be recognized that the regulated electric utilities, telephone utilities, gas utilities, and the railroads are all part of the economy along with the non-regulated industrial concerns. The utilities and the industrials all compete for the same consumer dollar. Both are dependent for their capital on the same money market. The investors making up the money market are all free agents, having complete discretion as to where and how they invest their funds. They have their choice of a multitude of investment possibilities, including bonds, preferred and common stocks of public utilities, railroads, industrial companies and financial institutions, or real estate and other kinds of property. When an investor buys a security, he is interested in the safety of his investment, the earnings that will support it, the dividends he will receive, and the potential appreciation which may accrue to him through growth of the enterprise. Consequently, he will invest his funds in those securities and properties which show the best combination of all these factors applicable to his own needs, and he will avoid securities or properties which do not, in his opinion, have such attributes. The securities of those companies that have these essential investment characteristics will command a price in the market that will permit these companies to preserve their financial strength and integrity.

If a public utility company cannot show earnings commensurate with the risk of the enterprise, its senior securities will not have proper earnings coverage and its common stock will not have sufficient earnings to make it attractive at a reasonable price. Many of the railroads and the traction companies have long since found this to be the case. When earnings are unduly restricted, especially during periods of high business activity, a public utility company may not be able to build up its financial strength to provide for future contingencies and for poor business conditions and, therefore, may be unable to preserve its financial integrity.

In this regard, it must be recognized that industrial companies, while not regulated by commissions as to profits, are nonetheless realistically regulated by competition. Industrial companies can survive in the economic system only by meeting competition and being successful. For the public utility company, commission regulation is merely substituted for competitive regulation, which means that commission regulation should set the public utility profit at the competitive level. In this regard, I especially like the statement by Professor Walter A. Morton of the University of Wisconsin which he made in the May, 1952, issue of Land Economics:

"Its (regulation's) primary aim is to prevent utilities from taking advantage of the monopoly power granted them by the state. Regulation should put the 'consumer' in the same position vis-a-vis public utility enterprise that he is in with respect to truly competitive industry where he can buy services without discrimination at competitive prices and profits. . . .

"The competitive model serves as a basic guide to regulation."

This concept, as expressed by Professor Morton, clearly fits in with the rule stated by the Supreme Court of the United States in the famous Bluefield Waterworks & Improvement Co. case:

"A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties."

The difficulty in applying the Bluefield rule has been in finding the business undertakings with corresponding risk. In this regard, I think it's clear that the comparison must be made with non-regulated business. There are those who advocate determining the rate of return on the basis of the return earned by other utilities or on the basis of the so-called "cost of money" of other utilities. As the earnings of all utility companies are determined in substantial part by regulation, such a comparison involves circular reasoning and can not lead to a determination of the rate of return as required under the Bluefield decision.

One element of risk, and a factor having an important bearing on the earning power of an industrial enterprise, is the trend in demand of its product. Among the industries experiencing a growing demand for their product are the oil industry and the chemical industry. The oil industry has experienced not only a continued growth in crude petroleum demand but an even greater growth in demand for natural gas and petro-chemical products. In the chemical industry there has been a tremendous increase in demand for basic chemical products and for such specialties as the synthetic organics and plastic materials.

Analysts recognize the above-average growth of these industries and characterize their stocks as "growth" stocks. The electric utility industry and the telephone industry have also experienced a rapidly growing demand for their services. The rate of growth for their services has been above average and in line with that experienced by the growth for the oil and chemical industries. I have compared the growth in production of each of these industries—regulated and non-regulated—in a series of charts and compared the trend in each with the over-all trend of industrial production as measured by the Federal Reserve Board Index (See charts II, III, IV, V). Immediately apparent is the fact that from the point of view of economic growth, the electric utility and the telephone industry are in the same category as the oil and chemical industries.

Production for each industry is shown in relatives—1939 equalling 100. In 1953, the general level of industrial production was 139 per cent above 1939. In the oil industry *(chart II)*, crude production was up 87 per cent, natural gas production 240 per cent, and petroleum chemicals over 300 per cent. In the chemical industry *(chart III)*, chlorine production was up 475 per cent and synthetic organics over 500 per cent. In the electric utility industry *(chart IV)*, production of electric power was up 247 per cent, and in the telephone industry *(chart V)*, conversations were up 109 per cent and toll messages 247 per cent. Clearly the regulated industries are growth industries. But the investment analysts do not characterize the electric utility and telephone stocks as growth stocks for the reason that whereas under competition, oil and chemical companies have profited from growth, the electric and telephone industries under regulation have not.

The charts show the earning power of each of these industries as measured by the per cent earned on invested capital. Earning power of the oil industry has increased from about 6 per cent before the war to over 12 per cent in the postwar period—that of the chemical industry from about 10 per cent to approximately 15 per cent. In the same period the electric utility industry has shown no increase in earning power, the per cent earned on invested capital remaining below 6 per cent despite a tripling in power production; and the telephone industry has experienced an actual decline in earning power.

*(Please turn to page 44)*

# Corrosion of underground cables (Electrolysis)

By HAROLD B. McKAY

**PART II**

THE FIRST article of this series (TELEPHONY, May 7) gave a condensed version of the electrochemistry involved in the corrosion of lead sheathed underground cable. It was shown that the action in an ordinary battery was the same as that involved in such corrosion.

A rule was established which dictates that when metal of a positive polarity is in electrical connection with a fluid, corrosion of the metal results because small particles of the metal flow away with the electric current. (It was shown that cable which runs through different types of soil, or which runs in ducts which also contain moisture and impurities, can be subject to conditions which cause corrosion.)

"Electrolysis may take a long time to do its work" Bob Reese, chief cable tester for Pacific Telephone & Telegraph Co. in San Francisco told me. "This cable held up for over 40 years before it failed." The sample of cable armor was pitted and punctured with tiny holes.

"These markings are from shells. The land where this cable was buried was formerly under water, and had small sea shells mixed with the sand," he added.

"Some time during the years the duct sagged and collapsed, permitting the cable to rest in the wet soil. Electrolysis and the chemical in the shells finally did this."

I asked Mr. Reese, then, what was the fastest case of electrolysis that he had known.

"That was Treasure Island, in San Francisco Bay in 1939," he answered. "The island was made by pumping up sand from the bottom of the bay. The first cables we placed were temporary ones to serve the contractors who were building the exposition buildings. Therefore, we buried the cable in the sand without using ducts."

"Believe it or not, all of these cables had failed before we could cut them into service," he concluded, "The mixture of soils there acted worse than the strongest acid."

### Electric Railways

There is another phase to the problem of cable corrosion that is now nearly obsolete — the direct current operated street-car—and probably deserves little mention here. The problem is obsolete because the street-car is obsolete, and in any event it saw but little use in the service area of most Independent telephone companies.

However, a few street-car systems do exist, and where they do, a severe corrosion condition may be present. It should be mentioned that this same problem may exist wherever man-made direct current apparatus is in use. Such apparatus would include the trolley-bus which has replaced the street-car in some locations. It would also include dc current distribution systems where they still exist, elevators in buildings, signal circuits of railroads, telegraph, fire department or other utilities, burglar alarms, arcs in motion picture projectors, electroplating plants and other things. While cable corrosion from these sources is a rare occurrence, cable maintenance departments should make it their business to know where all dc sources operate in their areas. This knowledge just might clear up a bad case of electrolysis corrosion with a minimum of effort.

Ordinarily, such direct current generated by others is confined to their own plant or premises—or at least is supposed to be. However, such current may leak into other structures and find parallel paths which will take it through the telephone company cable armor.

So, while this type of trouble has virtually disappeared, it should not be disregarded, unless it is definitely known that it does not exist.

A single example will perhaps be enough to demonstrate how trouble of this sort can occur. The much maligned trolley-car will do for an illustration. Suppose a street-car track runs down the same street, or a street near to

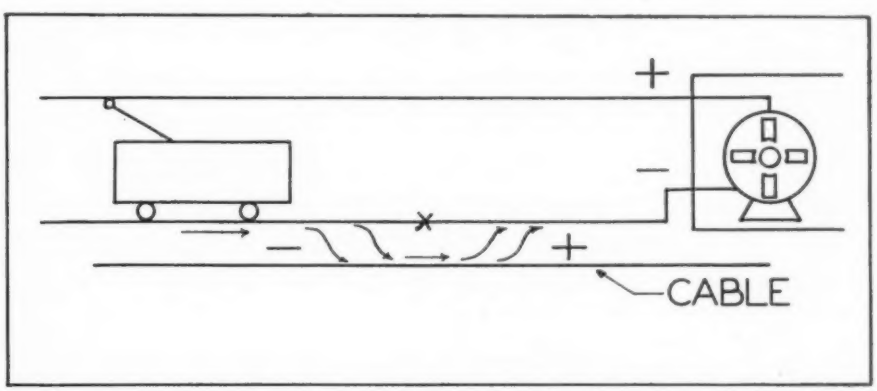


**Fig. 2.1. There are not many trolley-cars left these days, but those that remain can still cause trouble to telephone cable. A loose joint at "X" in the track can cause return currents from the street-car to travel on the cable sheath instead of the track. Note that even though the railway uses a negative track, the telephone cable will be positive at the point where the traction currents leave it to return to the track as shown by the arrows at the right. This will cause corrosion of the cable.**



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the one in which the cable is buried. Let's say the trolley is positive and the track negative.

Now, suppose there is a loose fishplate or joint in the rails, and the bond of copper wires which should bridge the joint has broken off. Whenever a car comes along the track, part of the return current from the motors leaks away from the rail and travels through the ground. It will enter waterpipes or cables or anything else metallic and travel along these things, because they are better conductors than the poor joint in the rails.

**Rail Corrodes**

Up to this point positive current will enter the cable from the soil, thereby making the cable negative. As has been shown, current entering the cable does it no harm from a corrosion standpoint unless alkali is present. Actually, in this case, the rail would be corroding. However, the current will travel along the cable until it gets past a bad joint in the rails, then it may take off, go back through the soil to the rail. This causes the trouble, because the point where it leaves the cable is positive, hence it corrodes. *(Fig. 2.1)*

Notice that the rail is negative with respect to the trolley. Beyond the defective rail joint it is still negative with respect to the trolley, but it is positive with respect to the cable. Between the power house and the bad joint it is negative to both cable and trolley. By the same illustration, it can be seen that the cable is positive to the earth at one place and negative at another.

It is very important that this relation be remembered at all times in dealing with electrolysis. What counts is not the absolute or assigned polarity or voltage of a conductor—it is the polarity and the voltage of the conductor when compared to something else. Thus, as was shown, merely because a cable is buried in nice, neutral earth, it does not put it at neutral or ground potential. Even though ground potential may be regarded as zero volts as far as the telephone exchange is concerned, different points along the cable may be of different polarities and different voltages every few feet or even inches for that matter. The fact that so many different conditions can exist in a buried conductor is the reason why the problem of electrolysis is a big one, for which no simple answer exists.

**Corrosion Committee**

If a telephone company has a corrosion problem, the first step towards correcting the trouble is to make tests. The purpose of the tests will be to determine the nature and extent of electrolysis in the cable plant and to plan corrective measures. However, before the tests start, the most important thing is to have a committee.

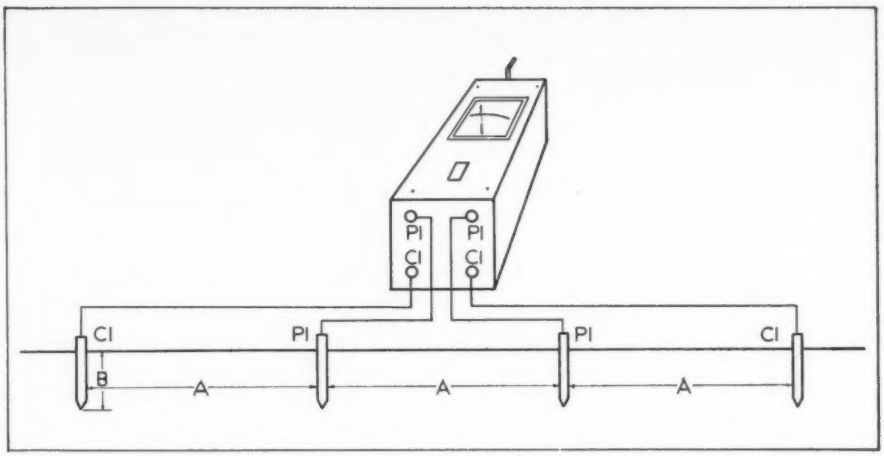



**Fig. 2.2. Earth Resistivity Tests. The resistivity of soil may be measured with a ground megger connected as shown. The meter is hooked up to the center ground rods and the generator of the megger to the outside rods. Spacing between the rods should be equal, and should be the same as the depth to which the resistivity is to be measured. That is, 3 feet apart to measure the value 3 feet down, etc. The rods should be driven down to a depth which is equal to one-twentieth of the distance between the rods. Resistivity per cubic centimeter of earth then equals the meter reading in ohms (R), times the distance (A) between the rods in centimeters, times 2 pi (6.28); that is Resistivity = 6.28 AR.**

The committee should be composed of a representative of every interest which has buried metallic structures in the area. This would include likely prospects such as the water company, power company and gas company, but should also include the railroad, pipe line operators in the vicinity, and owners of any dc electrical equipment. Even buildings and bridges with steel members which enter the ground are involved in the electrolysis problem of a community, and, in addition, such things as gas holders or oil storage tanks may have built-in electrolysis protection features which must be reckoned with by the telephone company and others.

The corrosion committee in a community should establish adequate records to which all parties have access, which shows the location of all underground metallic plant as well as all interconnections and protective devices. This record may not be presently available, and may have to be built up from a cold start as work by the committee progresses. One prime function of the committee is to keep each other informed. Attempts to correct an electrolysis condition in one item of plant, may only result in the plant of another company corroding instead, unless information is exchanged freely.

**Testing Equipment**

The principle tests that are made in tracking down electrolysis trouble are as follows:

(1) Cable sheath to earth voltage. (Measured with voltmeter of 100,000 ohms per volt sensitivity or better.)

(2) Cable sheath current. (Measured with low sensitivity voltmeter having a 0 to 1 millivolt range.)

(3) Earth resistance near the cable. (Measured with ohmmeter or groundmegger.)

(4) Duct resistance. (Same instrument as above.)

(5) Voltage to other structures. (Measured with either voltmeter.)

These tests are usually made with an ordinary radio type ohmmeter or megger, and a highly sensitive millivoltmeter (one that measures thousandths of a volt.)

In addition a recording voltmeter, usually one of the smoked paper chart variety, is of great practical use.

The significance of the tests made with the above equipment might be summed up as follows:

The polarity of the cable to earth, if positive, indicates a set-up by which corrosion can occur. However, here the arbitrary or uncertain part of it comes in. A positive potential is considered safe by some *if* less than .1 volt, and *if* there is no current flowing in the sheath, and *if* the earth resistance is high, and, further, if no evidence of corrosion is noticed. All of this adds up to practically no advice at all.

This is where the accumulated experience of the men who work on this problem in a given area comes in. Electrolysis and corrosion is a life-long work. Some cables may be in place nearly a lifetime before they fail, others may fail in the same place every couple of months. Further, the matter of cost and policy may be a factor. It may be cheaper to fix a corroded cable now and then than it would be to provide electrolysis protection to every cable in a system of underground

plant. Therefore, the action to be taken in view of certain meter readings must be decided upon by the people concerned.

Ordinarily, electrolysis readings may be taken at a point of repeated failures, or the company may find it desirable to make such tests for future reference at the time each new cable or replacement is installed. Some may find it advantageous to make tests at annual or other intervals in order to observe if electrolysis conditions have changed.

When this is done, it is usually done after the spring thaw, because frozen ground will not give accurate readings, and moisture content is usually highest, thereby showing conditions at their worst.

Other tests, such as the resistance of the earth around the cable are important when the potential is positive because if the resistance is high, little current will leak into the earth, hence there will be little chance of corrosion. Low resistance around the cable, of course, means the best chance of heavy current flow into the earth and fast corrosion.

**Sheath Current**

Current flowing along the sheath is measured by placing the millivoltmeter probes at two spots on the cable, a few feet apart, and from the measured voltage drop calculate the direction and magnitude of current flow. This reading is sort of a check to confirm what might have been deduced from the voltage and resistance readings. In general, it means that if current is flowing along the cable, at some point it must be entering and at another it must be leaving, and that corrosion can be occurring where it is leaving with positive polarity with respect to the earth. The direction of flow tells the direction in which to look to find this point.

It perhaps should be mentioned here that negative polarity from the cable to earth may in most cases be safe from an electrolysis point of view, but exception mentioned earlier holds true if the soil is alkaline. In this case, a different kind of chemical corrosion may result which will be made worse by the negative electrical condition. The ground may be alkaline naturally or because of leakage from cement mixtures, factory wastes, concrete around ducts or other causes. How much negative voltage can be tolerated depends upon the degree of alkalinity. Two-tenths of a volt is regarded by some as the maximum in alkaline soil, with about 1.5 volts in non-alkaline soil.

The recording voltmeter suggested for use in this work may reveal some interesting things. Most always it will show up conditions which result from man-made direct currents, if they are of an intermittent nature. The smoked chart which shows a day's change in the voltage between the cable and earth, for instance, may show the same pattern, day after day.

It may take a local Sherlock Holmes to finally associate the pattern on the voltmeter chart with the schedule of an electric railroad a few miles away, or the starting and stopping of the dc arc in the projector in a movie house, or the ups and downs of a dc elevator in a nearby building, or some other equally remote-seeming incident.

The story these instruments tell is sometimes pretty far-fetched, but true

**This half-cell is used to make contact with the pavement when making voltage readings. It is an insulated cylinder with a porous plug at the bottom, and is filled with a solution of lead chloride.**

nevertheless. In San Francisco, for example, a recording voltmeter placed by Pacific Telephone & Telegraph Co. in one of its manholes, faithfully recorded the movement of electric trains and street-cars in the city of Oakland, 7 or 8 miles across the bay, because of the change in voltage drop across the San Francisco-Oakland Bay Bridge.

An interesting thing about this bridge is that the telephone company constantly monitors the voltage drop across it by means of a relay which connects to the submarine cables which parallel it. If the voltage exceeds a certain amount, the difference in potential is sufficient to operate a relay which brings in an alarm to cable maintenance headquarters.

When this alarm sounds, the company notifies the bridge authorities, who promptly inspect the railroad tracks on the bridge in order to see where they have become grounded to the structure. This avoids corrosion of both the bridge and the telephone cables in the bay below it. All of which shows that electrolysis jobs can be of considerable magnitude.

**Testing Problems**

It would seem from the above that the matter of spotting a potential corrosion condition was rather simple. Actually, it is simple enough to read the meters and arrive at an intelligent conclusion from them—once the variable factors have been eliminated. The variable factors are quite small indeed, but none the less vexing because of their size. One of the first is that of contact potential. To measure the voltage of anything, you have to connect a voltmeter to it. If you can make a clean dry contact, there is nothing to it; you read the meter and that's that.

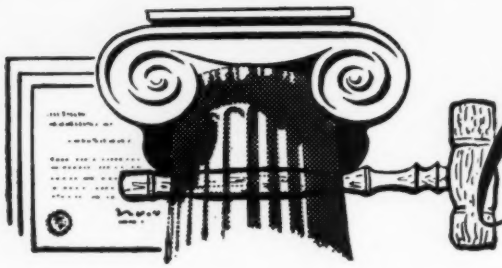
In measuring the cable voltage to ground, for instance, one probe of the meter makes a nice dry contact to the cable armor. The other has to connect to ground, and there's the rub. If the ground, or the bottom of the manhole is dry, no current would flow, and you would get no reading. So if it isn't wet, you have to wet it.

Immediately when the ground becomes wet, it becomes an electrolyte, that is a fluid which conducts electricity. In it is a mixture of all sorts of chemicals and impurities. The test probe from the voltmeter is metal, and metal touching fluid makes a battery all by itself, as was explained in the beginning of these articles. The voltmeter will give a reading, but the question is, "What is it reading?" Is it the voltage of the cable to ground, which is what we want, or is it the voltage of the little battery being formed in the bottom of the manhole where the test plate or rod is in the muck? Is the sheath the same polarity as the little battery at the end of the pick, or is it opposite? Is one of the voltages adding to the other or subtracting from it?

**The Half-Cell**

Unfortunately there are no answers to all of these questions. So in order to get a reliable reading a simple stunt is used. This involves the use of a "half-cell." The half-cell, as the name implies, is one-half of a wet-cell battery. One type consists of a lead plate submerged in a solution of lead-chloride. Another type uses copper sulfate. This half-cell is connected to the end of a wire and is placed upon the soil, pavement, or sump of a manhole to provide the ground connection for voltage measurements. In construction, it consists of a glass container or equivalent, with the lead rod stuck into the solution from the top. The bottom of the

*(Please turn to page 38)*



# Courts and Commissions

## Florida Commission Questions Operation of Co-op; OKs Raise

Florida Railroad & Public Utilities Commission on Apr. 28 approved rate increases for Santa Fe Telephone Co., the recipient of approximately $900,000 of REA loan funds.

The commission stated it is "greatly concerned over the future of this utility (Santa Fe Telephone Co., a co-op) and feels that the (co-op) must exercise every means available to it in order that its available revenues will be sufficient to enable it to carry on its obligations to provide adequate and efficient telephone service to its subscribers."

The commission also said that the revenues provided by previously existing rates appeared to be insufficient for the effective operation of the co-op's system and the retirement of the REA loan.

It was observed by the commission that the Santa Fe co-op has approximately 1,000 subscribers within an area of 15,000 square miles; also its present facilities include modern automatic equipment.

In summarizing its findings the commission said:

"Since June 7, 1951, the applicant (Santa Fe co-op) has operated under rates fixed by this commission; however, the revenues provided by said rates appear to be insufficient for the effective operation of said system and the retirement of the Rural Electrification Administration loan in accordance with the loan agreement.

"As of Dec. 31, 1954, (the co-op's) plants in service less accrued depreciation amounted to $847,663.

"At the same time it had an operating deficit of approximately $117,000 and was seriously delinquent in its payments to the Rural Electrification Administration under the loan agreement.

"The (co-op's) total operating revenues for the six months ended Dec. 31, 1954, was $25,485, while its total operating expenses before taxes of any kind amounted to $36,148."

The commission also noted, "The record in this case discloses that this (co-op) is in serious financial difficulties and the continued service of more than 1,000 telephone subscribers in its service area is in serious jeopardy."

It went on to say, "After giving full consideration to the anticipated revenues which should accrue to the (co-op) if the requested increases are granted, and after taking into consideration the increased number of stations which the (co-op) expects to cut into service during the coming year, the (co-op) will still continue to operate 'in the red.'

"Under such circumstances the commission has no alternative but to approve the requested increases in order that there may be no interruption of service to more than 1,000 subscribers in the area served by the (cooperative)."

Then the commission remarked:

"This commission is greatly concerned over the future of this (co-op) and feels that the (co-op) must exercise every means available to it in order that its available revenues will be sufficient to enable it to carry on its obligations to provide adequate and efficient telephone service to its subscribers.

"There is a limit to the increases which a (cooperative) may profitably apply to its rates and charges. There inevitably comes a time when subscribers are lost because of unreasonably high rates and charges.

"The evidence in this case indicates that even the increases sought in this proceeding may cause the (co-op) to lose some subscribers.

"It becomes imperative under such circumstances for the (co-op) to inaugurate operating economies in order that it may avoid any further increases in the cost of telephone service to its many subscribers."

## SW States Asks Ark. Authority For Stock and Bond Issue

Southwestern States Telephone Co., Brownwood, Tex., has asked the Arkansas Public Service Commission for authority to issue 2 million dollars in first mortgage bonds and to sell 40,000 shares (1 million dollars) of $25 par preferred stock, it was reported on Apr. 26.

Proceeds will be applied to the company's construction program. The company plans to spend 5.5 million dollars this year improving facilities in Texas, Oklahoma, Louisiana and Arkansas.

## Allows City Tax to Be Passed on to Subscribers

The Virginia Corporation Commission unanimously approved on May 3 a request of the Chesapeake & Potomac Telephone Co. of Va. to collect gross receipts taxes, levied as license taxes, from subscribers within cities charging the tax.

Effective immediately, the ruling will apply to approximately 120,000 Virginians. Affected will be residents of Arlington County, Alexandria, Christiansburg, Danville, Falls Church, Hampton, Newport News, Poquoson, Portsmouth, South Norfolk, Staunton, Suffolk, Warwick and Winchester, plus a number in Henrico County.

Some cities charge a gross receipts tax of one-half of 1 per cent, except Newport News and Portsmouth, which levy a 3 per cent tax.

At a hearing conducted earlier by the commission C & P said that although the taxes amounted to only $87,000 annually, it was feared a widespread movement for such a tax could bring about a general telephone rate increase in the state.

Agreeing the tax should be limited to the locality in which it was levied, the commission said: "The effect of the amendment is to increase the rates charged in a locality by the amount of the gross receipts tax levied by the locality.

"The telephone company's stockholders have no financial interest in this controversy, because a public service company is entitled under the constitution of Virginia and the constitution of the United States to charge rates high enough to reimburse it for all expenses, including taxes. The real parties in interest are the local subscribers versus the subscribers in the rest of the state."

The commission held local subscribers should pay the local tax because they "are the citizens who benefit directly from the levy of the tax . . . the proceeds of the tax are used to pay the expenses of that locality, to maintain its streets, parks, schools and police and fire departments . . . if this tax were not levied, the citizens of that locality would have to pay an equal amount in other taxes."

Explaining the commission's requirement to fix rates, it said: "In our opinion, it would be unjust and unreasonable to fix rates in such a way that citizens throughout the state could thus be forced to pay taxes for the support of the streets, parks, schools and other municipal activities of the city of Newport News. Throughout our history taxation without representation has been regarded as an unjust governmental policy."

Opponents at the hearing had attempted to show that a gross receipts tax was no different in principle than franchise fees, but the commission said the case before them involved only the gross receipts tax.

"This case," the commission said, "does not involve franchise fees that are agreed upon between the company and a locality as a condition of the use of the streets pursuant to . . . the constitution. It is limited to gross receipts taxes imposed on the company regardless of its content."

In some areas, franchise fees are paid localities by the company through a contractual arrangement which has the consent of the company.

## Ky. Co-op Asks Commission To Direct Company to Sell

A newly-formed telephone co-operative's request that it be authorized to buy two exchanges in Hardin County was taken under consideration by the Kentucky Public Service Commission on Apr. 27.

The Twin County Rural Telephone Cooperative asked the commission to direct Southern Continental Telephone Co., Cookeville, Tenn., to sell two of its Kentucky exchanges at Sonora and Glendale to the co-op, the Associated Press reported.

The co-op contended it could serve Glendale and Sonora better than Southern Continental.

## New York Independent Places $150,000 First Mortgage Bonds

Midstate Telephone Co., Inc., Manlius, N. Y., on May 5 placed with Berkshire Life Insurance Co. Pittsfield, Mass., $150,000 of first mortgage bonds due 1980.

This represents additional financing through Berkshire, which in 1951 had purchased $200,000 of Midstate's first mortgage bonds due 1975.

Purpose of the new issue is to refund existing bank loans and to provide funds for continuation of the company's construction program.

## Federal Court Dismisses General's Arkansas Rate Plea

Leaving utility rate problems in Arkansas to the Arkansas Public Service Commission, a three-judge federal district court unanimously decided in Little Rock on May 2 to dismiss a suit in which a telephone company sought to increase its rates despite commission disapproval last year.

General Telephone Co. of the Southwest, San Angelo, Tex., serving Texarkana and 10 other Arkansas communities, had asked for a federal injunction to stop the commission from interfering with a proposed $300,000 rate increase.

The company contended the commission disapproval of higher rates in effect deprived the company of its property rights in violation of the federal constitution.

John R. Thompson, counsel for the commission, said unless the federal court dismissed the case, it could plan on setting rates from now on. "If you set this case for trial," he said, "you will upset every rate basis in Arkansas."

General Telephone had a remedy in state courts, Thompson added, and the company should refile its rate increase request and produce records to back up such a request.

He noted the company could raise its rates under bond, subject to refunding money in the event the commission refused to grant a rate increase.

Representing the company, Charles C. Wine said under an arrangement between the two Texarkana cities involved, the commission rate applied to both. He said Texarkana, Tex., prohibited rate increases under bond. Their hands are tied in Texarkana, he said, which represents a sizeable part of the holdings in the system.

General Telephone contended the integrated Texarkana system brought the dispute within federal jurisdiction. It argued the commission order directly affected Texarkana, Tex., and a Wake Village, Tex., exchange, because the rates were tied together by agreement.

Apparently the decision of the U. S. District Court leaves the company two courses of action. The company may either appeal the federal court's ruling to the U. S. Supreme Court or it may refile its rate application with the Arkansas commission.

## June Hearings Scheduled for Kansas Companies in Rate Cases

The Talmage Switchboard Association has asked the Kansas Corporation Commission for permission to increase its rates from 66⅔ cents to $1.25. This would total $950 more annually for the company. The hearing will be held on June 13.

The commission set June 10 for hearing an application of the McKrae Telephone Co., Fredonia, for a $24,280 rate increase for 13 southeastern Kansas towns.

## Bell Files $60,000 Damage Suit For Long Distance "Jamming"

Southern Bell Telephone & Telegraph Co. on Apr. 28 filed a $60,000 damage suit in Atlanta against certain strikers and their union officers because of what the company called "Operation Zilch."

Earlier a state court there issued a temporary restraining order against this alleged scheme for jamming long distance service.

Heading the list of damage-suit defendants is Joseph A. Beirne, international president of the striking CIO Communication Workers of America.

In the petition for the court order, Southern Bell said Operation Zilch works in this manner:

Union members place long distance calls to fictitious persons at telephone numbers of other union members. Those union members refer the call to other such numbers until finally the call is canceled.

The company seeks $10,000 for injury to its business and $50,00 punitive damages.

## New York Independent Granted New Rates for Two Exchanges

The New York Public Service Commission has accepted a tariff filed by General Telephone Co. of Upstate New York, Johnstown, designed to establish common rates for service rendered by its Corinth and Luzerne exchanges, effective May 14 when operations at Corinth are scheduled for conversion to automatic.

Under the new tariff, toll-free service will be provided between the two exchanges, thereby eliminating the present 10-cent charge for such calls. The new monthly rates are: One-party residence, $4.75; four-party, $3.25; multi-party, $3.75. One-party business, $8.00; two-party, $6.00; multi-party, $6.25.

The company acquired the Corinth exchange by purchase in December, 1952.

## Nebraska Companies Granted Raises, Authority to Borrow

The Nebraska Railway Commission granted the Naponee Home Telephone Co. permission to increase rates effective July 1, it was reported on Apr. 27. A group of Naponee residents pro-

tested, but the commission decided the company was operating at a loss.

The commission also granted increases for the Keystone-Arthur Telephone Co., effective May 1. The present flat 20-cent rate for service between Arthur and Keystone will be changed to a regular long distance schedule.

Patrons of the Keystone-Arthur company first objected to the increase but later agreed, after the company promised to install a new switchboard and add an extra operator.

The Odell Independent Telephone Co. was authorized to increase rates for all classes of service effective June 1.

On Apr. 12 the Hyannis Central Telephone Co. was given permission by the commission to borrow $23,000 to modernize plant facilities and to cut over to automatic.

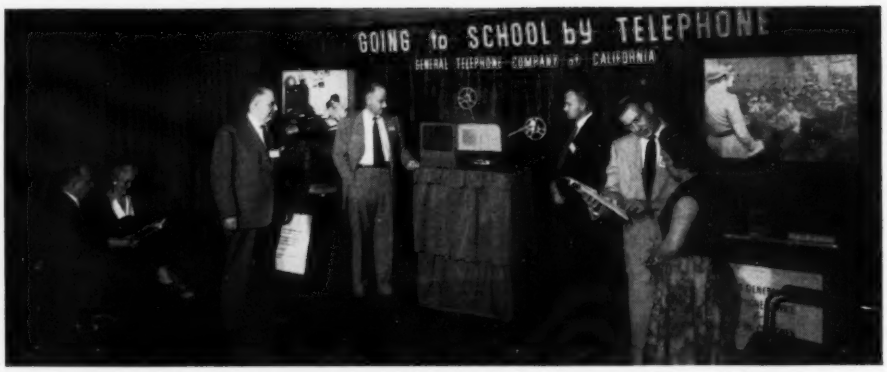
The company proposes to borrow $5,200 which will be secured by a mortgage on its real estate. In addition to this, it proposes to borrow $17,800 which will be secured by a mortgage on its real estate and on an automatic switchboard and associated equipment. It will give another mortgage on all its telephone property securing both notes.

The notes are dated Mar. 1, 1955, and mature Mar. 1, 1962. The $5,200 note will be retired at the rate of $75.98 on interest and principal per month and will bear 6 per cent interest. The $17,800 note will be retired at the rate of $260.06 on interest and principal per month, and will also bear interest at the rate of 6 per cent.

## General of the SW Gains Rate Increases in Texas

General Telephone Co. of the Southwest, San Angelo, Texas, was granted the following rate increases during the month of April:

| *Exchange* | *Old* | *New* |
|---|---|---|
| *Bronte:* Magneto, 343 stations | | |
| One-party business | $5.00 | $7.50 |
| Two-party business | 3.65 | 6.00 |
| One-party residence | 3.00 | 4.50 |
| Two-party residence | 2.65 | 3.50 |
| *Robert Lee:* Magneto, 392 stations | | |
| One-party business | 5.00 | 7.50 |
| Two-party business | 3.65 | 6.00 |
| One-party residence | 3.00 | 4.50 |
| Two-party residence | 2.65 | 3.50 |
| *Spearman:* Dial, 619 stations | | |
| One-party business | 6.75 | 8.50 |
| Two-party business | 5.00 | 6.75 |
| One-party residence | 3.75 | 4.50 |
| Two-party residence | 3.25 | 3.75 |
| *Matador:* Common battery, 396 stations | | |
| One-party business | 7.50 | 9.50 |
| Two-party business | 6.00 | 8.00 |
| One-party residence | 4.25 | 5.25 |
| Two-party residence | 3.50 | 4.25 |
| Four-party residence | 3.00 | 3.50 |
| *Benjamin:* Dial, 137 stations | | |
| One-party business | 7.00 | 8.25 |
| Two-party business | 5.50 | 6.75 |
| One-party residence | 4.25 | 5.00 |
| Two-party residence | 3.50 | 4.00 |
| Four-party residence | 3.00 | 3.50 |
| *Estelline:* Dial, 101 stations | | |
| One-party business | 6.25 | 8.50 |
| Two-party business | 5.00 | 7.00 |
| One-party residence | 3.50 | 4.50 |
| Two-party residence | 3.00 | 3.75 |
| *Stafford:* Dial, 212 stations | | |
| One-party business | 8.00 | 9.00 |
| Two-party business | 6.50 | 7.50 |
| One-party residence | 4.50 | 4.75 |
| Two-party residence | 3.75 | 4.00 |
| *Annona:* Dial, 122 stations | | |
| One-party business | 6.50 | 8.50 |
| Two-party business | 5.50 | 7.00 |
| One-party residence | 3.75 | 4.50 |
| Two-party residence | 3.25 | 3.75 |
| *Three Rivers:* Common battery (Conversion), 495 stations | | |
| One-party business | 3.50 | 7.75 |
| Two-party business | 3.25 | 6.00 |
| One-party residence | 2.50 | 3.85 |
| Two-party residence | 2.25 | 3.00 |
| Four-party residence | — | 2.50 |




**A four-minute TV film which showed how shut-in pupils may keep up with their lessons at home attracted many spectators to the booth set up by General Telephone Co. of California at the Apr. 13-15 international convention of the International Council for Exceptional Children held at Long Beach (Cal.) Municipal Auditorium. School and home units of the system could be operated by spectators. Some 2,000 school administrators and others interested in the development of handicapped children attended the convention.**

## Commission Authorizes Kansas Co-op to Buy Three Exchanges

A plan by the S and T Co-operative Association, reportedly of Goodland, Kan., to acquire telephone exchanges at Levant, Brewster and Kanorado and convert them to automatic operation was approved on May 4 by the Kansas Corporation Commission.

Jeff Robertson, commission chairman, said the Goodland co-operative proposes to borrow $444,000 from the Rural Electrification Administration and raise $22,850 locally to carry out its plans.

He said the association ultimately would serve customers in Sherman, Thomas, Wallace, Rawlings and Cheyenne counties.

**"In the future, as in the recent past, our major objective will be to provide people everywhere with the opportunity to own shares in American business, on a sound basis."—KEITH FUNSTON, *president, New York Stock Exchange.***

## Canadian Company Acquires New Radio-Telephone Links

The Department of Transport radio-telephone and teletype facilities in Prince Rupert and the Queen Charlotte Islands have been purchased by the North-west Telephone Co., Vancouver, B. C., effective as of May 1, B. R. Tupper, company vice president and general manager has announced.

Included in the purchase is the radio-telephone site and equipment on Mount Hays, and similar equipment at Sandspit. Terminal equipment at Masset is already owned by North-west. All are very high frequency (VHF) frequency modulation (FM) channels.

At the present time, there are voice and teletype channels operating from the Mount Hays station (Prince Rupert) to Sandspit, Masset and Annette Island. The terminal equipment on Annette Island is owned by the Alaska Communications System.

All circuits at present are used solely by the Department of Transport, with the exception of one commercial circuit linking Masset with Prince Rupert. Mr. Tupper said that North-west intends to open a second VHF link—this one between Sandspit and Prince Rupert, with a connecting link to the exchange in Queen Charlotte City. This will make it unnecessary that communication from Queen Charlotte City to the mainland be made through the landlines, up Graham Island to Masset, to join the radio-telephone link, as is done presently.

The line on Graham Island is a particularly difficult one to maintain in view of the high winds and rough weather there. With a link direct from Sandspit and Queen Charlotte City to the mainland, it will be possible to maintain commercial radio-telephone service in all types of weather, Mr. Tupper pointed out, and passengers, changing planes at Sandspit, will be able to place calls from the airport.

# THE PLANT MAN'S Notebook

*by Ray Blain, Technical Editor*

RECENTLY your writer was briefed on a new phase of automatic ticketing which proved to be extremely interesting. The identification of the extension on any PBX system arranged to make calls into an extra-unit zone has recently become a most serious problem in several localities, according to our information. These calls are bulk-billed as a total number of units and no means are available to indicate what PBX extensions initiated the calls. In some areas, a local call of long duration could cost a total of several dollars.

This new system of automatic ticketing will correct this condition in the following manner. When a PBX or satellite extension dials a trunk or tie line, it is automatically identified and the calling number stored in suitable equipment associated with each trunk. The extension then dials the called number. The extension number next will be automatically transmitted to the automatic ticketing equipment in the main exchange during the ringing period.

We understand that this intelligence may be transmitted during the dialing period but that during the ringing period it is generally considered most desirable.

This arrangement appears to be a definite step forward in the development of satisfactory automatic ticketing systems. It will permit practically all of the ticketing equipment to be installed in the main exchange, but will at the same time provide an adequate record of all originating traffic on either a PBX or a satellite system.

• • •

As a rule, telephone operators possess more than average hearing ability. Perhaps this is due to the fact that their hearing is trained to a point not usually attained by the average individual. Seldom, too, does an operator's hearing ever become impaired.

However, there are a few isolated cases in which faithful operators have become troubled by impaired hearing. This, we are well advised, cannot be blamed in any way upon the operator's occupation, but primarily is due to the physical make-up of certain types of individuals.

In such cases, a remedy is now available by means of a special headset equipped with a transistor amplifier. This amplifier is housed in a box so small that it can replace the usual double-prong plug on the headset cord. External connections are not necessary, and no alteration of the switchboard circuit is required. The gain is adjustable up to a maximum of about 12 db by means of a small control knob.

• • •

We received a letter recently from Alden P. Lunt, president of Ansonia Wire & Cable Co., in which he advises us that his company is presently conducting courses in cable splicing in an effort to make a contribution to the Independent telephone industry in furthering the knowledge of the use of plastic cable.

The methods of instruction used in these splicing schools consist of both theory, motion picture demonstration work of field installation practices, and the actual making of splices by trainees in both the taped and hot gas-welded methods. This service is provided at no charge to the trainee, although he is expected to provide his own transportation to and from Ansonia as well as his own meals and lodging. The course varies somewhat in length, depending upon the number of trainees involved, but usually runs from three to five days.

The Ansonia company prefers to train groups of not more than 12 and not less than five. These schools are not run at any stated time, but requests for training are accumulated and when a proper-sized group has built up, a firm date is set for the program.

While the actual training at the Ansonia plant lasts only from three to five days, the men who go back into the field have further contact with the company field engineers who are located in strategic areas across the country. Moreover, brush-up work is available to these trainees, also.

• • •

**It has been said that the lack of something to feel important about is almost the greatest tragedy a man may have.**

• • •

The Pennsylvania Telephone Association, in its bulletins for the past two issues, has reprinted what the Pennsylvania newspapers are saying about the Independent telephone companies of that state.

This plan appears to be an excellent idea as it will certainly encourage individual operating companies to keep their local newspapers current concerning their activities. The publicity in Pennsylvania appears to be outstanding and it should contribute much to the promotion of good public relations there.

### CORRECTION

**In *Table II* (page 20 of the Apr. 23 issue of TELEPHONY) of the first installment of the article entitled "Rural Telephone Growth Forecasting" by E. C. Turner, the same symbol was used to denote *business* and *residence* subscribers. The author suggests that squares be used to denote *business* subscribers and circles to indicate *residence* subscribers.**

**The reason for distinguishing between business and residence is readily obvious in a survey for a central office district where manual equipment was scheduled for replacement by automatic. The portrayed movement of the business development would indicate the probable need for a new center.**

# The OPERATOR'S CORNER

by MAYME WORKMAN, Traffic Editor

THE pleasure of a happy occasion or experience is enhanced by sharing it with our friends, and I am happy to relate, in one, two, or three articles, my recent visit to the beautiful Hawaiian Islands.

I left the Springfield, Ill., airport on the morning of Apr. 15, arriving in St. Louis, Mo., in 25 minutes. While waiting to board the TWA plane for Los Angeles, I met a young woman who was also on her way to Honolulu to join her husband who is stationed there. Her family was apprehensive about her taking the trip alone and, after learning that I, too, was Hawaii-bound, and that we were taking the same Pan American plane out of Los Angeles, they were relieved to know that their daughter would have a traveling companion. We shared the same seats on both planes and had a lovely trip together. The last time I saw my friend was when her husband was greeting her upon our arrival at the International airport in Honolulu, and may I say, most affectionately, as they had been separated for some time.

When we arrived in Los Angeles about 6:30 p.m. on the evening of Apr. 15, my cousin and her family met me at the airport and we had dinner together, and a good visit, as we meet infrequently. My cousin's little granddaughter, Barbara, aged 9, was happy to meet me for the first time and clung to my hand most of the time during my stay in Los Angeles, which, of course, made me very happy. My stock went up when I bought her a purse she had been admiring in the airport shopping center.

At 11:59 p.m., I boarded the plane for Honolulu. After a full and busy day, my companion and I were ready to tilt back our chairs, tuck our pillows under our heads and cuddle up in our blankets, and we were soon fast asleep. I chose a coach flight which resulted in a saving of more than $200 on the round trip fare, as there is no difference in the planes, and $200 is a lot to pay for a little champagne and a few other luxuries. Being a good flyer and sleeper, I knew I could rest comfortably in a coach seat.

About 7 a.m., we enjoyed orange juice, coffee and a sweet roll, and then freshened up for our arrival in Honolulu at 8 a.m. Our plane arrived a few minutes ahead of schedule. As we were approaching Honolulu, it was a beautiful sight to see the sun and the blue water of the ocean. We were excited and thrilled to be arriving at our destination.

I had been informed that a committee would be at the airport to meet me, but when I arrived, there was one lone man with a beautiful lei, whom I judged to Bob Fischer, secretary of the John A. Balch Chapter of the Independent Telephone Pioneer Association. He recognized me, too, and explained that the members of the committee had stopped in the coffee shop, and we started in that direction in time to see the members of the committee going toward the plane. We walked up behind them and you should have seen the expression on their faces when they saw Bob and me and realized their guest had arrived and they were not there to greet her. It is these little things—such as the friendly surprise they showed—which add so much to any happy occasion.

Many of the committee members were officers, or former officers of the chapter, with whom I had corresponded through the years, and I began to identify them: "You are Priscilla and Cecelia Texeira, Sadie Hunter, Dorothy Konishi, Bill Kea, Reiko Kimura, etc." Don't ask me how I recognized them—I don't know. Just a woman's intuition.

They covered me with beautiful leis and warm greetings, typical of the islands, "kisses, I mean," and about that time Douglas Guild, vice president of the Hawaiian Telephone Co., made his appearance with a beautiful lei and customary greeting — Lucky Me! The newspaper photographer was busy taking pictures, and then I was taken to the Edgewater Hotel where I was to stop during my stay in Honolulu.

Reiko Kimura and Dorothy Konishi accompanied me to my room, unpacked my bags, hung up my clothes, and in a few minutes I was comfortably settled. They were greatly amused when I said, "Reiko, I think you are Hawaiian, and Dorothy, Chinese," (they both being Japanese, and what wonderful girls they are!)

After a shower and change, I was ready to attend a buffet luncheon at the Moana Hotel on the beach of Waikiki, sponsored by the Wahini (women) members of the John A. Balch Chapter. Imagine eating out of doors, with the ocean breeze, and the beautiful sea as a background, to say nothing of the delicious food. We talked, laughed and ate until it was time to listen to the "Hawaii Calling" broadcast, which was presented just opposite our table. When you hear the roar of the ocean on this program, it is not a sound effect, it is the real thing. They have a microphone at the beach to record the sound of the waves.

The MC recognized visitors from all of the various states and you may be sure I lost no time in raising my hand when he queried, "Who is here from Illinois?" California had the largest representation, naturally because they are among the nearest to the Islands.

The songs and the music were beautiful, my companions were delightful, the weather was perfect, and I was extremely happy. All of the wahinis signed my program, the first item to start my collection of mementos from the Islands, which I hope to exhibit in the Pioneer Lounge at the national convention in Chicago next fall.

After we left the Moana Hotel, we took a little stroll before I returned to my hotel to dress for the evening's festivities, a cocktail party and buffet supper at the home of Ballard Ather-

ton, president of the Hawaiian Telephone Co.

Bill Kea, president of the John A. Balch Chapter, and his lovely wife, Sybil, picked me up at 6 p.m. and we proceeded to the home of Mr. Atherton where we were warmly received by our host. I was entranced with his beautiful home. Looking out of a picture window, you have a beautiful view of a waterfall, flooded with light. The grass was like a velvet carpet and I feasted my eyes on the beauty of the scenery.

The guests included the officers of the Hawaiian Telephone Co. and their charming wives. Also my good friend Joe Veltmann, whom I met in Chicago a number of years ago when he was with the telephone company and the Pioneer chapter, and his lovely wife. Joe said, "Mayme, do I look the same?" I said, "Yes, Joe, but there is more of you." He took my remark good naturedly and we had a lot of fun reminiscing about our meeting in Chicago. It was on this occasion that I learned it was proper to remove your shoes when paying a call to a home in Hawaii — a wonderful practice, in my book! Joe is now with the Hawaii Medical Service Association in Honolulu, the Blue Shield plan for Hawaii.

At an early hour, supper was served, and what a meal it was! After the sumptuous buffet luncheon at noon, I thought I would never be hungry again, but—who can resist such delicious food, served in such a delightful atmosphere?

As the evening wore on, and some of the guests departed, Doug Guild rolled back the rugs and we started to dance. As others discarded their shoes, I did likewise, and was it fun dancing in your stocking feet! Some of the guests and their husbands danced the traditional hula, much to my delight, and after a little persuasion, I tried it, too, and believe me it was an entirely new version of this beautiful dance.

All too soon the hour for departure arrived and when I arrived in my room I realized it was going to be a short night, or morning, as Priscilla Teixeira and her sister Cecelia were calling for me at 6:45 a.m., to take me to Mass and then for a day's entertainment on the Island. But that will be another story. My first day in Honolulu was a delightful one and I was so happy to meet so many of the telephone folk in person whom I had known by name only.

In order to facilitate the completion of my story about my visit to the Hawaiian Islands, the customary questions and answers will be omitted. They will be resumed again when these articles have been completed.

# USITA Dial Interexchange Committee Explains AMA and CAMA Terms

THE TERMS AMA (Automatic Message Accounting) and CAMA (Centralized Automatic Message Accounting) are terms which recently have become quite commonplace in our industry. Discussions with members of the Independent segment have led to the observation that they mean different things to different people. To help clarify matters, the Dial Interexchange Committee (of the United States Independent Telephone Association) met with representatives of the Bell System in New York after which the following report, having first been rechecked with Bell, was prepared for release.

The terms AMA and CAMA have been used synonymously by some with customer toll dialing. It is true that AMA or CAMA is never used except with customer toll dialing. The converse, however, is not true. There may be customer toll dialing without AMA or CAMA as these terms are used in the Bell System.

For example, there may be customer toll dialing under an arrangement by which the apparatus would automatically print a toll ticket similar to the ticket written by an operator. This would be "automatic toll ticketing." Similarly, the apparatus may punch a tape which is later "analyzed" and possibly translated to IBM (International Business Machine) cards. This also would not be qualified to be known as AMA or CAMA, as Bell uses these terms, unless there is complete identity to certain equipment and end results used and currently produced only by Bell.

AMA — This system was originally designed to work with certain local *crossbar* systems to record mechanically *on perforated tape* billing information detail for multi-message units, and long distance messages, and provided automatic identification on one and two-party lines for calls that could be dialed with the use of not more than seven digits.

The next step in the development of AMA was to increase the register capacity beyond seven so that it could be used for recording calls customer dialed into areas requiring the use of directing codes. However, it is still limited to crossbar offices and cannot be used in panel or step offices.

Another inherent feature of this system is that it *always* produces the detail of the calls dialed on a perforated tape. This tape may then be processed in such a way that it will produce punched cards or a typed statement for billing purposes. It also produces as one of the "end" processes a commercial stub for use in business offices. This "stub" provides the business office with information similar to that furnished with a manual toll ticket and accounting system, so that most queries by customers regarding toll calls billed may readily be answered. It should be noted that some calling details, such as an extension number or a name, will not be available. This information is entered on a manually prepared ticket, if furnished by the customer.

AMA as used by the Bell System is not a generic term to apply to any equipment capable of performing the same or similar functions. To Bell it always means one thing only—a particular equipment arrangement as currently made by Western Electric Co. Even though Western produces different arrangements for automatically recording customer dialed toll calls and automatically accounting the same, they are not known to Bell people as AMA.

AMA equipment is limited in its use to the office in which it is installed. Thus, there may be a number of AMA installations in a given exchange.

Since AMA will function only with crossbar offices, it was necessary for Bell to develop a system that had more universal application. Such a system is called CAMA and it serves the following purposes:

(1) It may be installed in any single exchange where there is an adequate volume of "charged" calls to be customer dialed.

(2) It has the added advantage that it will function on a centralized basis for other offices in the same exchange (multi-office city) or for offices outside the exchange area.

(3) Unlike AMA the line and party (calling number) identification is not an integral part of CAMA equipment.

*(Please turn to page 48)*

# *growing?*

## Strowger Type 11 M-A-X grows with your

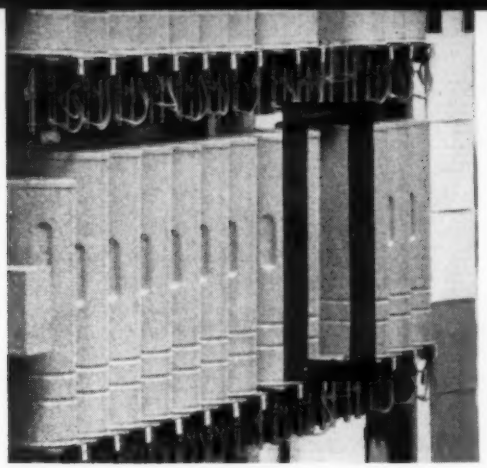
Are new homes, new stores springing up like wildflowers in your town? Then Strowger Type 11 M-A-X is the exchange for you!

With Type 11, you'll have no technical worries when you expand. You'll have no capacity limits to fret about. You'll merely order additional equipment as you need it, and put it in. It's as simple as that! Economical too, when you consider that each switch, each shelf, each frame is a pre-wired *unit*—made so more can be added with minimum time and labor.

On most Strowger Automatic Type 11 M-A-X's, you can expect delivery in a few short months. Type 11 can be supplied for nation-wide 7-digit numbering and can be used economically with Strowger Automatic Toll Ticketing equipment. Choose Type 11—first choice of successful telephone men. Arrange for a helpful consultation today! Address: *Automatic Electric Sales Corporation, 1033 W. Van Buren St., Chicago 7. Or, call HAymarket 1-4300.*

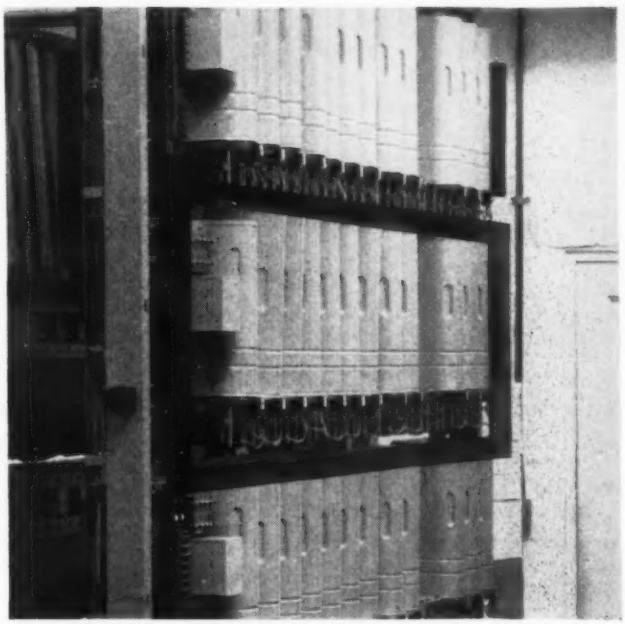
**For 80- to 400-line installations with expansion in prospect, a Strowger Automatic Type 11 M-A-X is your best investment by far. Experience proves it expands economically to meet any need.**

AUTOMATIC ELECTRIC



*Add a Switch* and you take care of moderate growth, quickly, easily. Just jack it into place on one of the numerous extra banks provided with your initial equipment. No wiring. No soldering!

*Add a Shelf* of switches when larger growth occurs. Each shelf is complete with pre-wired banks. Your men can install it quickly and inexpensively.



our town . . . economically!

*Add a Frame* with as many shelves of switches as you need, to meet heavy growth. There are no capacity limits to Strowger expansion.

*Why Gamble?*

XUM

# CORROSION OF UNDERGROUND CABLES

*Concluded from page 29*

container is made of a plug of wood, which is moist, of course, from the fluid within. This moist plug makes good contact with whatever it is placed upon.

These half-cells are now available as manufactured items, but at one time they were made up in the field.

In principle, the half-cell becomes a complete cell when it is connected to earth or anything else. Of course, as a cell, it develops a voltage. This voltage is largely determined by the metal and chemical used in its construction, and is rather independent of the substance which may be contacting it at the bottom. The voltage of this cell will be a known value (which is, however, subject to change as the cell ages), and hence may be subtracted from the cable to earth or other reading being taken. The difference between the half-cell voltage and the meter reading will be the true voltage of the cable sheath to ground. These cells have high internal resistance, hence are not used in resistance measurements.

**Soil Resistance**

Not so simple is the matter of soil resistance, or resistivity, as it is frequently called in electrolysis discussions. Resistivity is usually defined as the average resistance of a given *quantity* of soil—a cubic centimeter—and can be thought of simply as resistance.

Plant men who have made measurements from the testboard know that measuring the value of resistance faults on a line is practically impossible if the line has a foreign voltage on it. In measuring soil resistance, it would seem simple to connect an ohmmeter to a couple of ground rods or half-cells and get a simple reading.

However, ohmmeters depend for their action upon a battery contained in the instrument. The battery sends current through the meter, through the external resistance and back. The meter reading, therefore, is determined by the amount of current passed by the outside resistance. When the voltage of the inside battery, and the current flow are both known, the resistance can be determined by Ohm's Law. This calculation is already made in an ohmmeter and the scale in ohms printed on the face of the meter.

It will be seen that the reading is accurate only when the knowledge of the battery voltage is accurate. When such a meter is connected to earth in which current is flowing, the voltage present in the earth will add to, or subtract from, the reading and thus present an error in resistance reading.

This effect may be minimized by taking readings in both directions of current flow, in order that a compromise might be found. Readings must be made rapidly when contact is first made to avoid polarization effect errors.

Another method is with the use of alternating current, such as provided by a ground megger. The generator in

**An ohmmeter and a sensitive millivoltmeter are the most important instruments used in making electrolysis tests in underground ducts.**

the megger may be connected in a manner to put its voltage output into the ground through two separated ground rods. Between these rods, two other ground rods can be placed in the soil, and the meter of the megger connected to them. By the use of a formula and different spacing of the rods, resistance of the soil at different depths may be determined.

A different approach to ac soil resistance measurements which is used in oil wells is worthy of note at this point. This method which has been described in the literature (John Carroll—Electronics in the Oil Industry—*Electronics*—September 1954) uses two coils which are lowered into the well. One coil transmits an ac current which is picked up by another coil after traveling through the soil.

The next chapter of this series will show some actual examples of the use of the tests described, and the conclusions which might be reached from such tests.

## OBITUARIES

FRANK V. RHODES, who had been secretary of the California Independent Telephone Association since Mar. 1., 1942, passed away on Apr. 18 in Santa Monica, Cal., only two weeks after his retirement from that position because of failing health.

In his native state, Nebraska, he was initiated into the telephone industry in 1908. Until the United States

**F. V. RHODES**

entered World War I, he worked in various departments of the Nebraska Telephone Co. and its successor, Northwestern Bell Telephone Co. After the war, during which he served in France with the Medical Corps of the U. S. Army, he returned to his former employment in Omaha and remained there in the traffic department until 1923 when he moved to California.

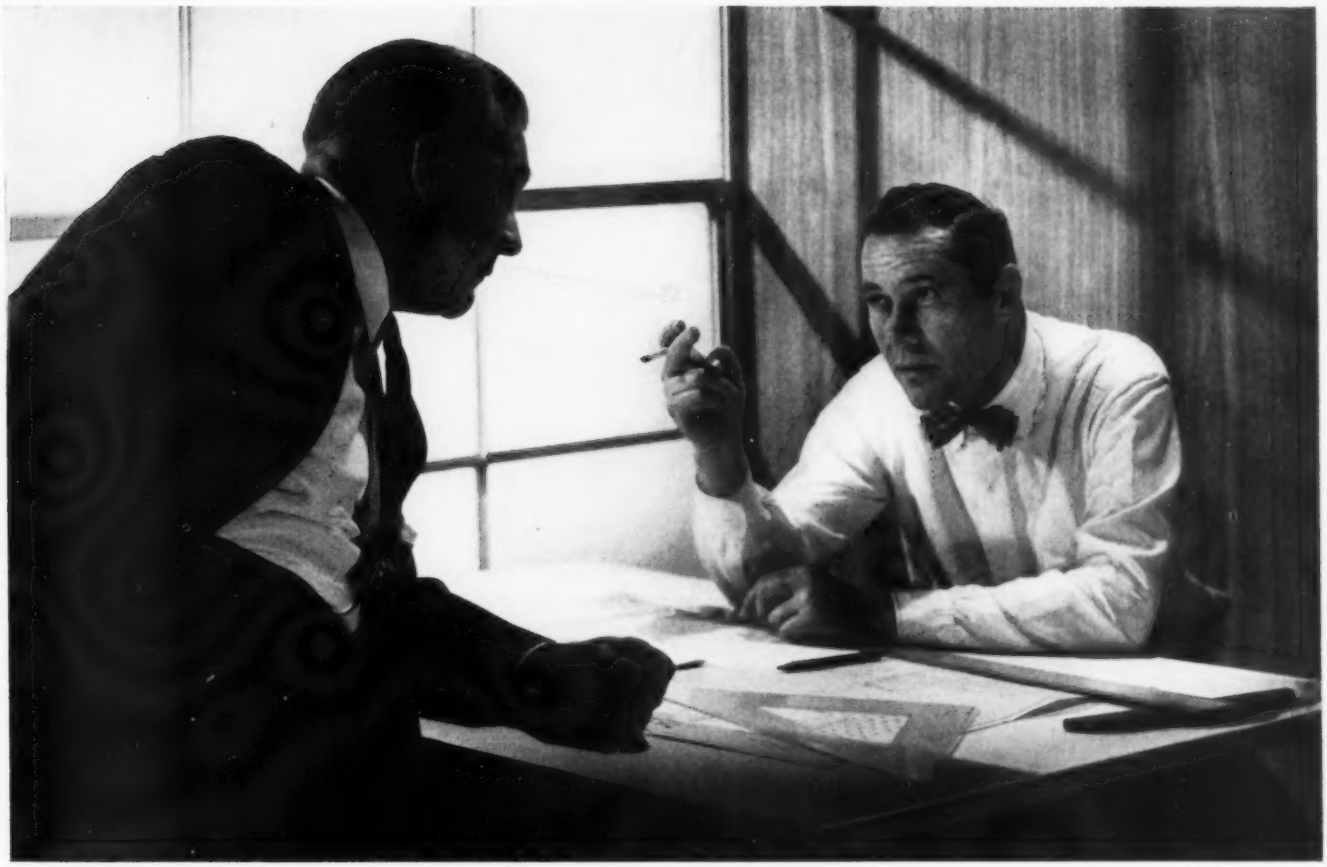
Mr. Rhodes was on the staff of the California Public Utilities Commission for a total of some 12 years and was operating vice president and engineering consultant for a number of telephone, water and gas companies located throughout the Pacific Coast and southwestern states prior to his acceptance of the position as secretary of the California association.

Mr. Rhodes leaves his widow, Mrs. Katherine G. Rhodes, and two sisters, Mrs. May Strough and Mrs. Hattie Parker, of Beatrice, Neb.

• • •

EARL A. TULL, 81, who had owned and operated the Lapel (Ind.) Telephone Co. for many years, died in Noblesville, Ind., on Apr. 19.

Mr. Tull went to Lapel from Fairland with his father about 1900. Together they operated the telephone company, and upon the retirement of his



## "Lenkurt's new '45 Carrier Concept' can really cut our capital investment!"

"These Lenkurt people have an idea—a *big* idea they call the '45 Carrier Concept'. It sweeps away once and for all the notion that interconnection between carrier systems used on open wire, cable, and radio must be on a voice frequency basis. It eliminates the need for a complete terminal at each junction to convert from carrier to voice frequencies and back again. This concept is the foundation of Lenkurt's new 45-class Carrier Systems: *interconnection at carrier frequencies!*"
Let's look at the advantages:

1. *Economy:* Many modulating and demodulating steps eliminated, with consequent big savings in equipment.
2. *Flexibility:* In engineering complete toll systems, you can use the facilities which are best adapted for each part of the route and still keep your equipment cost economically low.
3. *Performance:* Reduction in modulating and demodulating steps removes many sources of distortion.

Three 45-class systems are now available: the 45A (12-channel, open wire), and the 45BX (120-channel, radio), the 45BN (24-channel, cable). Other systems are under development.

Send today for helpful literature on 45A, 45BN, and 45BX.

*For the toll plant engineer:* All 45-class systems use the same, two-stage modulating plan. In the "pre-group" stage, four channels are placed in the 8-24kc range; in the "base-group" stage, three pre-groups (12-channels) are placed in the 40-88kc range. Since all 45-class systems use these same frequencies, then can be interconnected at the "pre-group" and "base-group" stage.

Address: Automatic Electric Sales Corporation, 1033 W. Van Buren Street, Chicago 7, or call HAymarket 1-4300.

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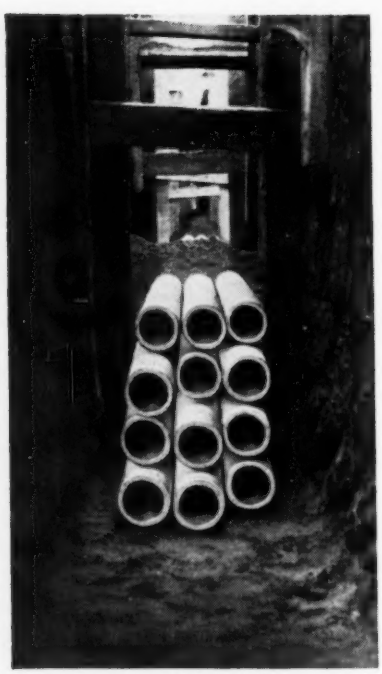
**AUTOMATIC ELECTRIC**—LEADERS IN CARRIER COMMUNICATIONS—**LENKURT**

**Long, lightweight lengths** of Transite Conduit with new J-M Plastic Coupling ready for far west telephone installation.

## ...makes **Transite Ducts** cost far less to install



**Transite Conduit** with new J-M Plastic Coupling are installed in direct contact, saving trenching time and backfilling.

This unique plastic coupling, developed by Johns-Manville especially for telephone service, enables you to install Transite® Conduit at greatly reduced cost. It provides the following advantages:

1. **No separation between ducts**
2. **One backfill instead of several**
3. **Narrower, shallower trench**
4. **Faster installation**
5. **Watertight, silt-tight joints**
6. **No joint sealer**

Furthermore, the tight joints formed by this J-M Plastic Coupling enable you to use pneumatic rodding instead of expensive hand rodding—and eliminate cleaning.

Major telephone companies find that Transite Ducts provide better cable protection at lower cost. Made of asbestos-cement, they can't rust, are immune to electrolysis, resist corrosion and all normal soil stresses. The light 10-foot lengths are easy to install . . . reduce the number of joints in the line.

For more information, call your nearest J-M District Sales Office or write Johns-Manville, Box 60, New York 16, New York. In Canada, Port Credit, Ontario.

JM PRODUCTS

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**TRANSITE DUCTS**

**MADE OF ASBESTOS**

father, Mr. Tull assumed full control.

Mr. Tull is survived by his widow and five daughters. Mrs. Tull will now become president of the company, and Mrs. Genevieve Tull Graham, a daughter, becomes the new manager.

Mr. Tull was a member of the J. R. Johnston chapter of the Independent Telephone Pioneer Association.

## IN THE NATION'S CAPITAL

*Continued from page 22*

grant, plus the "anonymous" half million, is big money even in these times. These two stories add up to a growth in the power of unionism which now paces any other economic power in this nation, short of the government itself. Could *that* be the next step—political control, as happened in England?

The special treatment which labor long enjoyed when in an underdog position ends, now that organized labor can dominate, theoretically, more workers and more production than all corporate industry combined, even if it were organized, which it is not. As former Secretary of Labor Perkins has recently been warning, big unionism which abuses its new strength will face statutory discipline as did big business in its day.

The way the Southern telephone strike has developed, all these big loans and "donations" will be needed to cope with the bitterness and violence that has been generated. Early settlement is difficult because calm negotiation under such duress is not possible. Without taking sides on the issues, the CIO or its prospective partner in merger, the AFL, may have to answer for the public some questions about labor's new responsibility along the following lines:

(1) Does the $1,250,000 loan mean that the CIO approves of violence and disregard of law and order?

(2) Does it mean specifically that the CIO favors intimidation, dynamiting, and wholesale destruction of property and even attempted murder?

(3) Does it mean that CIO unions would like to see labor relations returned to jungle tactics in order to force organization at any price in the Southern area?

President Joseph A. Beirne of the CIO Communications Workers of America says that it does not on all points. He says that his union "neither condones, nor sanctions" the damage done to the Southern Bell Telephone system during the current strike. He says that the CWA "does all it can to prevent such damage." He made the statement in a letter to CIO President Reuther who had asked for a report

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## ESTERON 245 cut maintenance costs

A "crew" of Dow chemicals, used separately or as a team, will cut your maintenance costs to a new low. Esteron® 245 is highly effective for year-around brush control when used as a foliage spray or for basal bark and stump treatment. Esteron Brush Killer is widely used as a foliage spray for brush control.

In addition, Dow offers two new products to solve specific vegetation control problems. Kuron, new Dow brush killer containing silvex, has shown good results on post oak, blackjack oak, white oak, Northern pin oak and other oak species as well as red and hard maples. Where grass control is desirable in poleyards and around substations, Dow Dalapon Sodium Salt 85%, new *systemic* grass killer, is recommended. It can be used in combination with 2,4-D to control *both* broad-leaved weeds and grass. Ask your supplier how Dow products can cut your maintenance costs and help you get positive weed and brush control. Or write THE DOW CHEMICAL COMPANY, Agricultural Chemical Sales Department, Midland, Michigan. In Canada: Dow Chemical of Canada, Limited, Toronto, Canada.

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# ESCO VERTICAL ringing equipment . . . a modern exchange

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Keep ahead of constant pressure to modernize and improve service, while holding space and cost at a minimum. Install ESCO vertically-mounted power and ringing equipment, just as the General Telephone Company of California did at The Baldwin Park Exchange—

EXCLUSIVE ESCO FEATURES — *space-saving vertical mounting*, completely pre-wired to fit into power line-ups. *Advanced Interrupter design*, for accurate and positive timing. *Improved Idler Drives*, with single-point adjustment that stays, for smoother operation, longer life — plus lubricated for life bearings throughout, quality construction of every component. All rotating parts dynamically balanced, and each assembly fully tested.

Factory built to your particular specifications, ESCO Vertical ringing equipment is available in standard or special power ratings and frequencies to meet your present and anticipated needs.

*Write today for full information.*

**ELECTRIC SPECIALTY CO.**

176 South Street, Stamford, Conn.


on the union's attitude toward the "reported cases of malicious damage of Southern Bell properties."

Well, if Mr. Bierne and his union is opposed to all this rough stuff, who's doing it, and why does it continue? Could it be that neither Mr. Bierne nor his organization is in control of the strike? If not who is in control of the strike, if anybody? The public will want to know.

### Local Taxes on Service Barred

Last week in this department your correspondent noted the arguments made by the Chesapeake & Potomac Telephone Co. and some Virginia municipalities in an interesting case before the state commission involving statewide telephone rates. This week, the story can be told of how it all came out. The Virginia commission has decided against individual municipalities attempting to raise taxes at the expense of telephone subscribers all over the state.

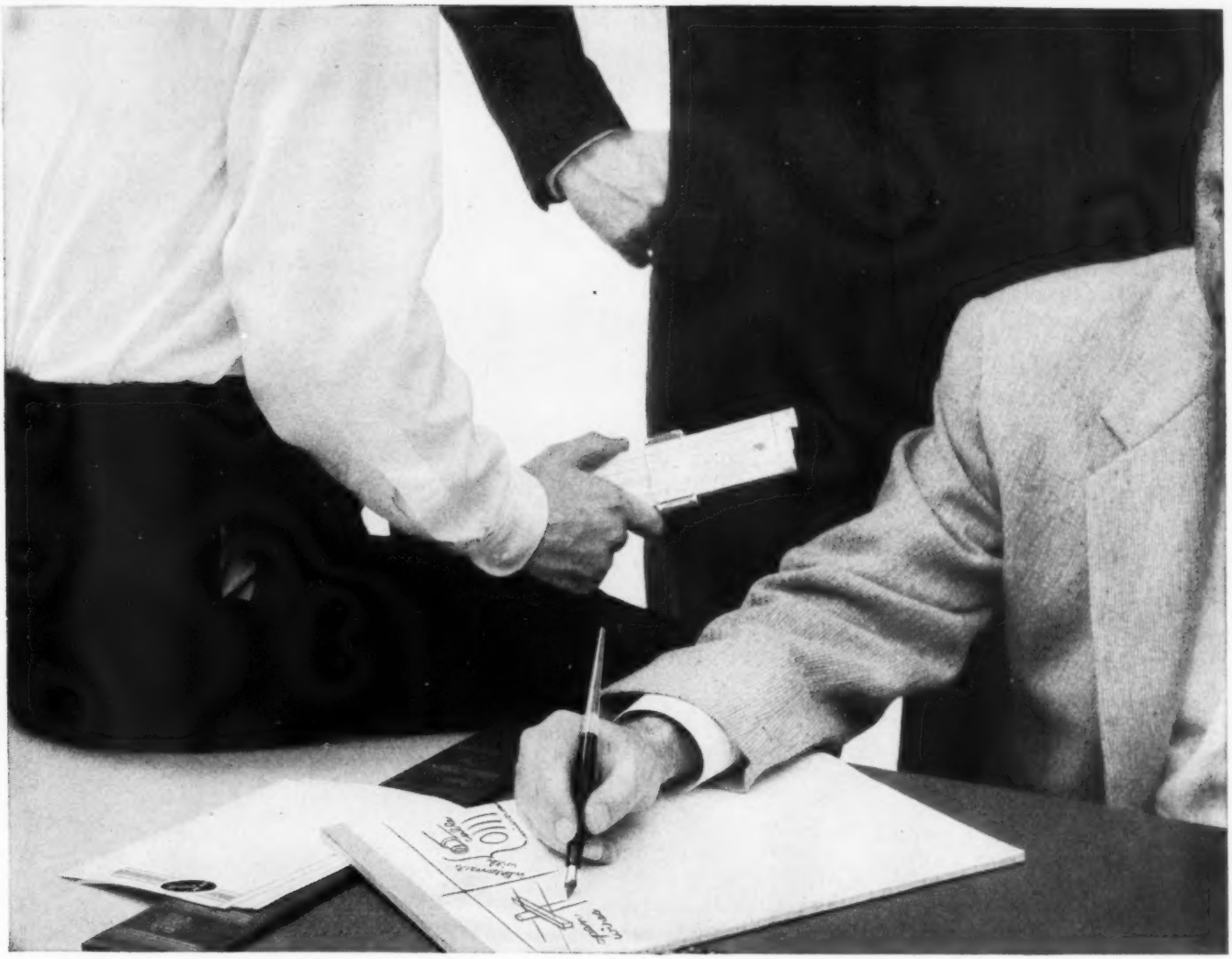
The Virginia Corporation Commission took its stand against taxation without representation, by granting Chesapeake & Potomac Telephone Co. permission to pass on to local subscribers the exact amount of a gross receipts tax levied in that locality. The order will affect telephone bills of about 120,000 subscribers in 15 cities and counties in amounts varying from one-half of 1 per cent to 3 per cent.

Commissioner Ralph T. Catterall, in a unanimous opinion for the three-member regulatory agency, reasoned that the commission has power to guarantee a utility a stated amount of money to cover its expenses. It would not be logical, Catterall said, to deduct from this amount a gross receipts levy in various communities.

"The telephone company's stockholders have no financial interest in this controversy," Catterall said, "because a public service company is entitled . . . to charge rates high enough to reimburse it for all expenses, including taxes. The real parties in interest are the local subscribers versus the subscribers in the rest of the state."

The Catterall opinion continued:

"If that subscriber (one in a locality which imposes the tax) does not reimburse the company for the tax, other subscribers will have to make up the deficit. No reason can be suggested why other subscribers should be called on to contribute to this type of deficit. The local subscribers on whose telephone bills the tax is levied are the citizens who benefit directly from the levy of the tax. The proceeds of the tax are used to pay the expenses of that locality, to maintain its streets, parks, schools, and police and fire department. If this tax were not levied,



# how Lenkurt's new

## INTEGRATED CARRIER CONCEPT can save you money!

*There's a brand-new concept in carrier: integration.* Now for the first time, carrier-derived telephone circuits can be planned to flow smoothly from open wire to cable to microwave—at carrier frequencies using the same type of carrier equipment!

Consider what this means in *simplicity*—in *better performance*—in *savings!* Expensive back-to-back equipment arrangements to convert carrier to voice to carrier are no longer needed. The result: less distortion, fewer maintenance problems, and a substantially increased range and scope of carrier applications.

Three interconnectible 45-type systems are now available: 45 A (12-channel, open wire); 45 BN (24-channel, cable); and 45 BX (24 to 120-channel, radio). Other systems are under development.

With Lenkurt's "Integrated Carrier" concept, carrier now enters a new, wider stage of usefulness. *Find out about this new concept today!* For detailed literature on 45A, 45BN, and 45 BX carrier, write: Automatic Electric Sales Corporation, (HAymarket 1-4300), 1033 West Van Buren Street, Chicago 7, Illinois. *In Canada:* Automatic Electric Sales (Canada) Ltd., Toronto. *Offices in principal cities.*

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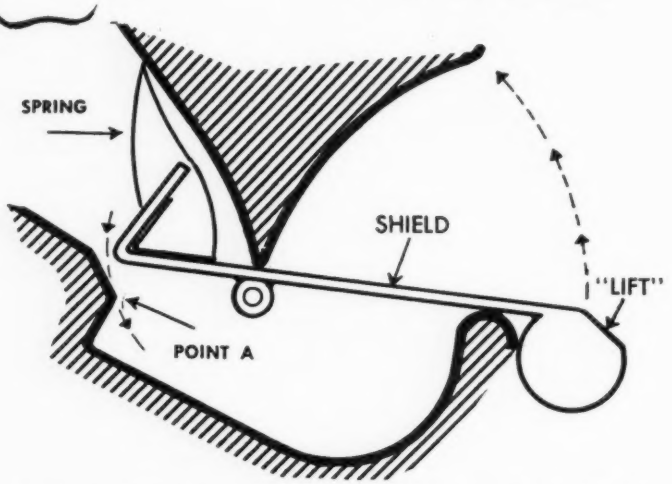
# Don't Be Cheated By "Coin Return Chute Stuffers"

*Install* THE SHIELD* Coin Return Protector




Deliberately plugged Coin Return Chutes cut Pay Station revenue because many customers assume that telephones are out of order if their coin is not returned. They are also a source of bothersome complaints, and can lead to substantial losses if refunds claimed by customers are not covered by collections from the station (as a result of stuffed chutes). Aware of this drain on revenue, the world's largest telephone company is replacing its entire coin return chute mechanism in almost all pay stations . . . at considerable expense . . . in an effort to eliminate chute stuffing. Now, with The Shield Coin Return Protector — the *only* anti-stuffing device available to independent telephone companies — you can gain similar protection, on any make pay station, at less than one-third the cost of replacing entire chute mechanisms.

*Patent Pending **WRITE FOR CIRCULAR 455-A**

**BUCKEYE TELEPHONE & SUPPLY CO.**

**1250 KINNEAR RD.** **COLUMBUS 21, OHIO**


the citizens of that locality would have to pay an equal amount in other taxes.

"The Constitution requires us to fix just and reasonable rates. In our opinion it would be unjust and unreasonable to fix rates in such a way that citizens throughout the state could be forced to pay taxes for the support of the streets, parks, schools, and other municipal activities of (a) city . . . Throughout our history taxation without representation has been regarded as an unjust governmental policy."

Opponents of the company's proposal had contended that a gross receipts tax was the same type charge as a franchise tax, that no special charge should be made to local subscribers because of the tax. In localities where a tax of one-half of 1 per cent is levied, a $6.00 bill will go up three cents. Where the tax is 3 per cent the increase will be 18 cents on a $6.00 bill.

## EARNINGS REQUIREMENTS

*Continued from page 26*

Investors as well as the investment analysts recognize the failure of the utilities to participate profit-wise in the growth of their services, and the stocks of the utilities have remained relatively static as shown on the charts. Thus in the period from 1939 to 1953, when oil stocks tripled in price, chemical stocks increased almost two and one-half times, and industrial stocks, across the board, more than doubled, electric utility stocks increased only 33 per cent and the American Telephone stock actually declined.

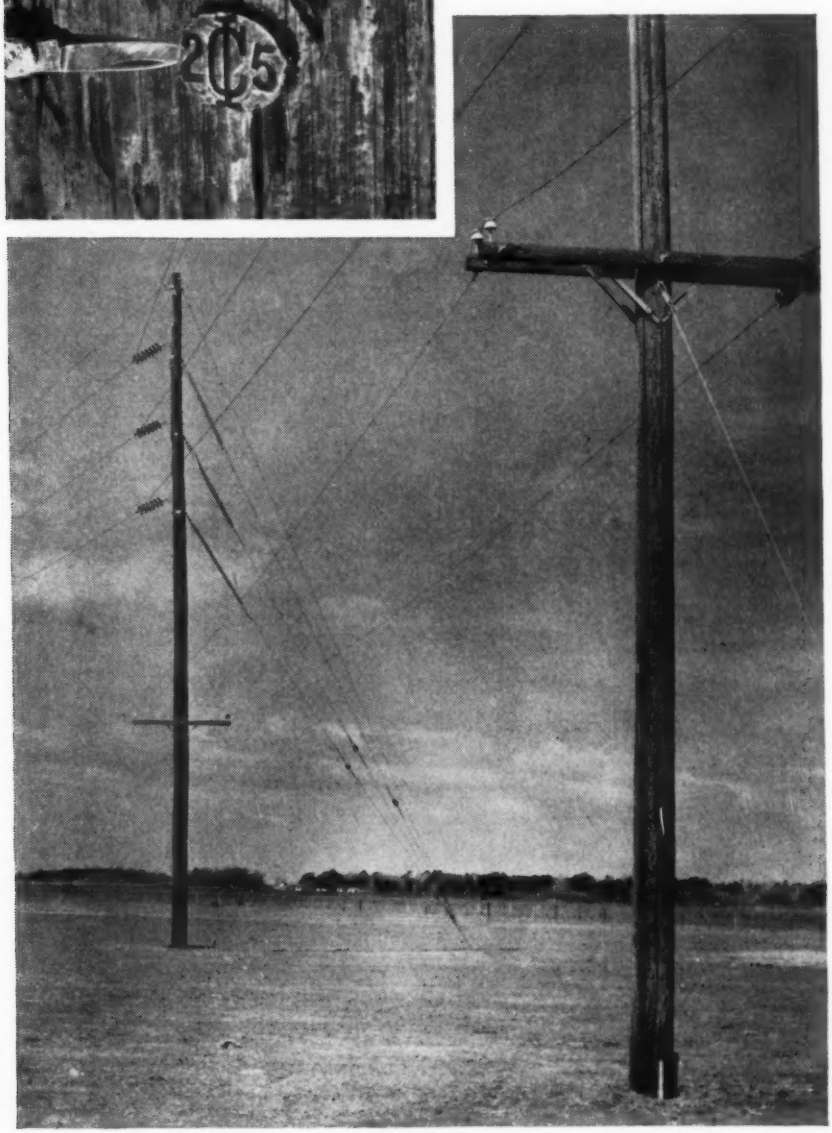
The last chart of the series *(chart VI)* summarizes the earning power experience and the investors' appraisal of these four industries in the period from 1939 to 1953. Also shown are the earnings of 20 large industrial companies which represent a cross section of American industry. It seems to me quite clear that the competitive model has not served as the basic guide to regulation of the electric utility and telephone industry since the war: the return allowed these industries is something below the competitive level, and the consumer instead of being placed in the same position vis-a-vis the public utility enterprise that he is in respect to truly competitive industry, has been placed in a preferential position in which he is in effect subsidized by the public utility investor.

Now, I am not suggesting that rate of return should be fixed for utility companies at the rate currently being earned by the chemical and oil industries. I am recommending, however, that regulation should attempt to fit the growing electric utility industry, the growing natural gas industry and the growing telephone industry into

## Here's Proof of Performance...

# Gulf States Utilities counts on over 30 years of service from *pressure-creosoted* poles

• One of the many poles marked with a 1925 dating nail, denoting 30 years of service.



**Gulf States Utilities Company,** serving 291 communities in southeastern Texas and south central Louisiana, uses pressure-creosoted poles exclusively in more than 10,000 miles of transmission and distribution lines.

"It would be foolish to think of putting an untreated pole in the wet, termite-infested soil of the Gulf Coast area," says John Jordan, operating supervisor. "We have come to expect over 30 years of service from a pressure-creosoted pole."

Gulf States used pressure-creosoted poles in its first inter-city line installed in 1917. Some of these poles are still in use today after removal to other locations.

"First cost of a pole is reason enough to take advantage of Creosote's ability to make poles last," says Mr. Jordan. "But a replacement is even more expensive when you consider it takes 50 to 60 man-hours to make a pole change."

With poles pressure-creosoted for adequate life, neither the utility nor its linemen have cleanliness complaints.

For best performance, from the standpoints of service and cleanliness, specify poles treated with the top-quality preservative—USS Creosote. For more information, contact our nearest Coal Chemical sales office or write directly to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

You can obtain clean pressure-creosoted poles upon specification and with proper inspection without sacrificing pole service life.

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**USS CREOSOTE**

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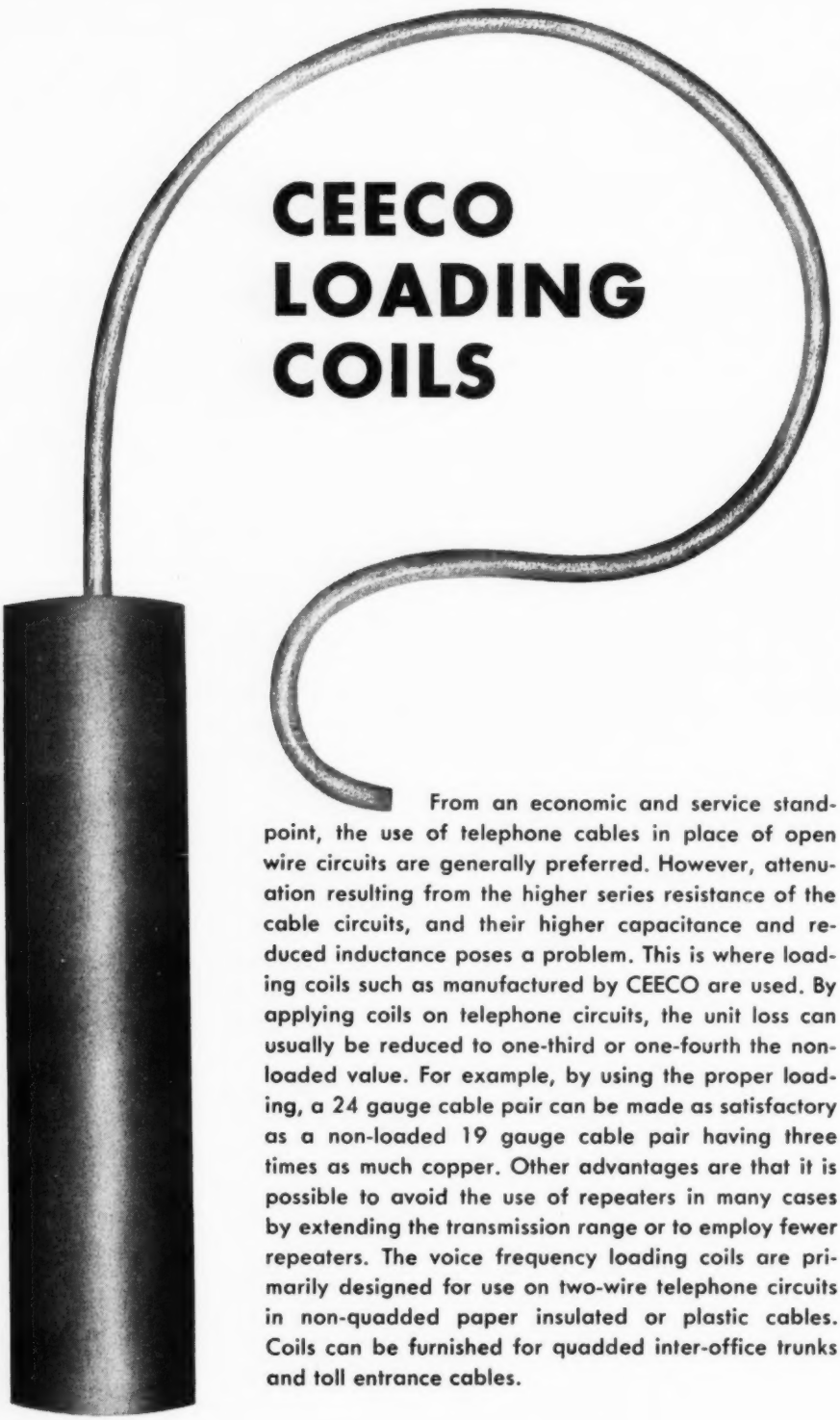
## You can reduce unit loss and use of repeaters with



# CEECO LOADING COILS

From an economic and service standpoint, the use of telephone cables in place of open wire circuits are generally preferred. However, attenuation resulting from the higher series resistance of the cable circuits, and their higher capacitance and reduced inductance poses a problem. This is where loading coils such as manufactured by CEECO are used. By applying coils on telephone circuits, the unit loss can usually be reduced to one-third or one-fourth the non-loaded value. For example, by using the proper loading, a 24 gauge cable pair can be made as satisfactory as a non-loaded 19 gauge cable pair having three times as much copper. Other advantages are that it is possible to avoid the use of repeaters in many cases by extending the transmission range or to employ fewer repeaters. The voice frequency loading coils are primarily designed for use on two-wire telephone circuits in non-quadded paper insulated or plastic cables. Coils can be furnished for quadded inter-office trunks and toll entrance cables.

**WRITE FOR CIRCULAR 654-A**

**BUCKEYE TELEPHONE & SUPPLY CO.**

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the general economic picture for growing industries in the industrial field and should recognize that a substantial competitive profit is a natural and *necessary* concomitant of growth. This approach to the utility earnings requirements suggests a return in the postwar inflationary period well above the return of about 6 per cent earned before the war. The increased earning power is required to build up surplus, to reduce debt, to help finance plants, to provide for plant replacement at higher price levels, and for other contingencies. A business concern during a period of rapid growth should follow a conservative dividend policy and should strengthen its capital position. The utility industry is not in a position to do this with earning power not benefiting from growth in demand.

There is no stigma attached to the fact that the chemical and the oil industry have shown good earnings since the war. Consumers are not worrying or complaining about the rate of return of these companies. Instead, the American people are generally proud of the achievements of these industries in developing new products, improving old ones, and in assisting in defense projects. It is rather strange in a way that so much emphasis should be placed on the desirability of low earnings for a utility company.

In the course of my business travels, I have been taken on many tours through the cities I was visiting and the surrounding countryside. During the course of such tours, I have been shown new supermarkets, modern factories and farms. I don't remember anybody ever telling me how little the supermarket and the factory earned. Or that the farmer had less income than he did before the war. Rather I am told that the supermarket is the best-looking one in the country and that the service is rapid and fine; that the factory is a leading producer and employer in the community; and that the farmer is earning big money and is always adding to his modern farm equipment.

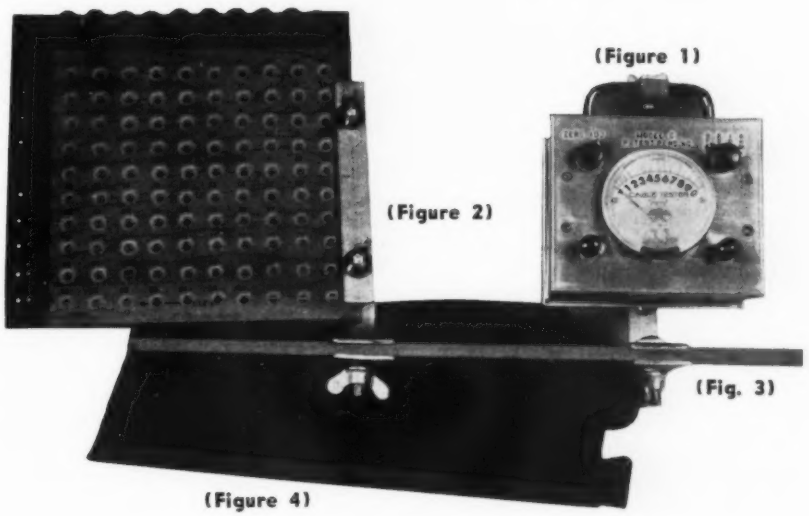
I realize that I have not offered any short-cut or easy approach to the problem of determining utility earnings requirements. I do not believe there is such an approach. However, the basic concept of public utility regulation in a capitalistic competitive society is not a difficult one. This concept is that utility earnings should be set at the competitive level. In seeking an absolute measure through the "cost of money" approach, regulation has strayed from the basic concept and earnings have fallen below the competitive level and below the requirements of the industry. All investors in the utility industry

# THE *Murphy* (ONE MAN) CABLE TESTER

NEW IMPROVED

**Over 1800 of these TESTERS now in use in United States, Canada and Hawaii . . .**

**NOW!** . . . for the first time, ONE MAN can test to identify cable pairs and do it three times as fast as two men could formerly do the same work. "ONE MAN" splicing crews are now a reality. On new cable work, labor costs are reduced by from 30% to 50% depending on just how far you are prepared to go in utilizing the ONE-MAN crew.



(Figure 1)

(Figure 2)

(Fig. 3)

(Figure 4)

## NOW WE CAN HELP YOU:

1. **REDUCE cable splicing costs even more.**
2. **Make the splicers work EASIER.**
3. **Eliminate many troubles and delays caused by wrapping cableends.**
4. **Still further SPEED UP new cable splicing operations.**

### MODEL C METER UNIT (Figure 1)

Three Test Sets in one — The Murphy ONE MAN Cable Pair Identifier, The Buzzer Continuity Tester — and the Ohmeter for locating trouble. Heavy, long-life battery with special bracket clamp to hold it in place. Can't shift, can't short out — can't leak.

### COMBINATION TAG & TERMINATING BOARD

Figure 2 (Model TTB) — Automatically sorts and groups the wires just the way you need them for connecting to the binding posts of the Terminal Board — only, in this case, the Terminal Board is built right into the Tag Board. Complete Directions with each unit.

### DUAL PURPOSE CLAMP (Figure 3)

This clamp will hold the Terminating Board at any angle, above or below the strand — for greater convenience and speed in boarding a cable. The clamp can be used to hold the present standard tagboard in position while using the earlier type of Terminal Board. The same DUAL PURPOSE CLAMP is also used to hold the METER UNIT above the strand, right over the splice, at any convenient angle, for the greatest visibility of meter face.

### THE NEOPRENE BAG (Figure 4) Model NP

The bag is simply slipped over the Terminating Board and taped down around the cable armor to seal out the weather. Bag is made of U. S. Navy Spec. High Tear Nylon Fabric covered on both sides with a heavy coating of Neoprene. Can be used over and over hundreds of times.

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Durable carrying cases are available for all units.

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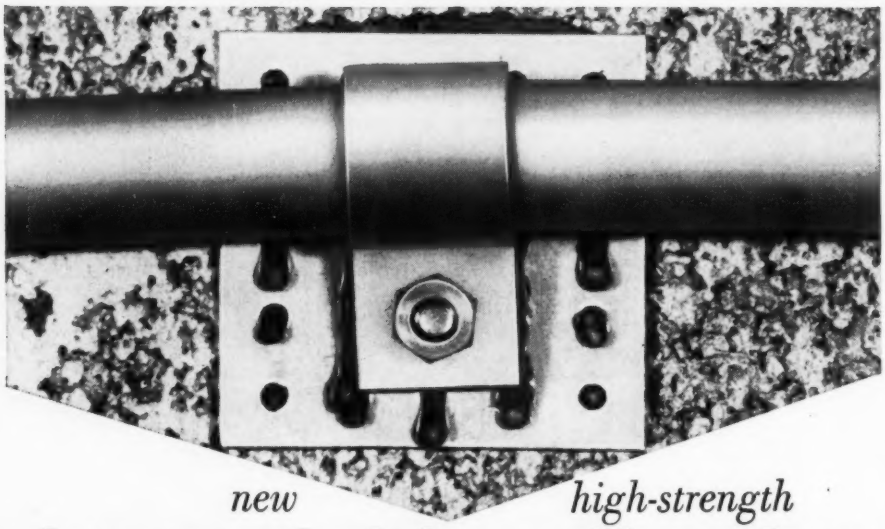

*new* *high-strength*

**dependable adhesive**

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Ask us for references on the long-life holding power of Placco 1000. Other advantages are elimination of drilling; ease of installation in congested areas; low cost; quick setting; adhesion to porous and non-porous surfaces; installation indoors or out.

A complete line of wire and cable hangers
is available in either stainless or galvanized steel.
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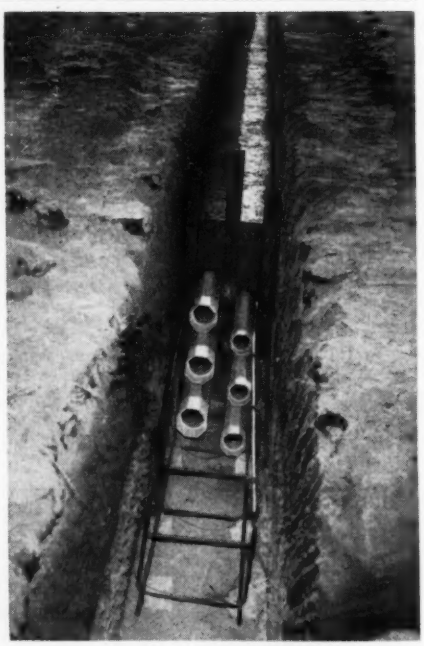
LINCOLN BOULEVARD **LATEX & CHEMICAL CO.** MIDDLESEX, NEW JERSEY

*When duct erection problems began to multiply . . .*

**OCT-O-DUCT Was The Best All-Around Answer**



EXCESSIVE groundwater was just one of several special problems on this underground duct system at the new college campus at Goleta, Calif.

Future roads made special reinforcing in the trench necessary, and plans required running both telephone and power circuits side-by-side.

Soapstone OCT-O-DUCT was the easy, inexpensive answer to every problem. Many thousand feet of 3-inch and 4-inch duct were laid in the same trench.

OCT-O-DUCT's low price and low installation cost, combined with its outstanding electrical, chemical and mechanical characteristics, have made it first choice with contractors and construction departments in telephone and power utilities throughout the West.

*Write for Specifications Bulletin 54A and for Installation Manual 54B.*

**SOAPSTONE DUCT COMPANY**

110 Linfield Drive, Menlo Park, California

have suffered as a result and have in effect subsidized the rate payers. Thus far, the utility industry has been able to attract sufficient capital from new groups of investors to provide necessary expansion. But then the utility industry has been unable to build up surplus, to reduce debt sufficiently, and generally to build its financial strength. It is important to the consumers, as well as the stockholders, that the utility companies remain financially strong and healthy. Adequate earnings will assure this strength. And the best guide of what constitutes "adequacy" is the earnings return of other business enterprises regulated by competition.

## USITA EXPLAINS TERMS

*Continued from page 35*

This identification may be accomplished either (a) by an operator whose only function is to ask the calling number and upon receipt thereof to key the number into the equipment, or (b) by automatic calling number identification.

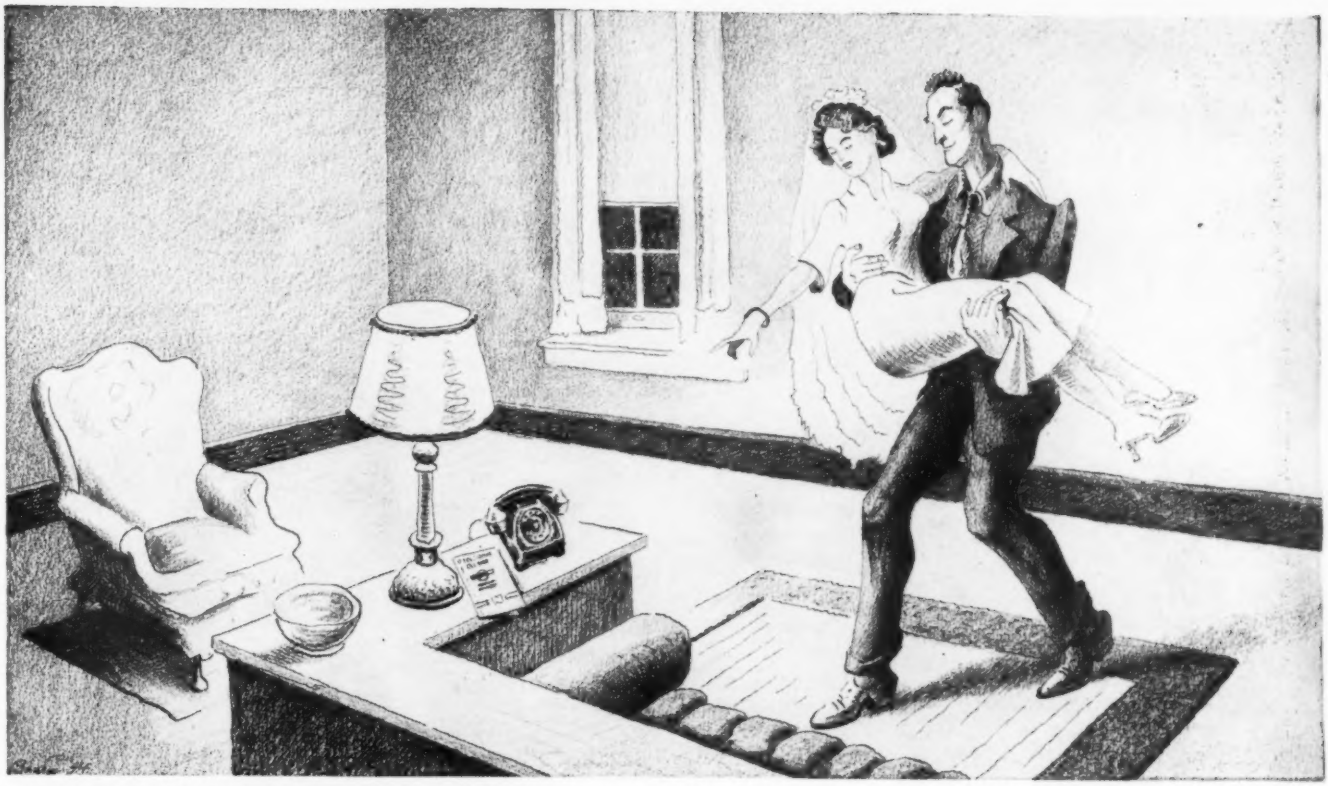
A brief explanation of these two identification procedures is:

(a) *Operator Intercept.* This is the most commonly known method and it requires that a signal be brought into an operator after the customer has dialed his long or short-haul toll call. The operator determines the calling number (by asking for it), key pulses it into the equipment and permanently disconnects herself. One, two, four or multi-party directory numbers may be identified on this basis. This arrangement is considered to be temporary and to be used only until automatic identification is developed and installed in all offices or exchanges connecting to CAMA. CAMA with automatic line identification is considered as permanent.

(b) Automatic Line (or number) Identification (ALI) is now being developed by Bell for use with CAMA and initially will be able to identify one and two-party service only, but eventually may be able to identify four parties on a line.

Little information is currently available as to how this number identification will operate in the offices (or exchanges) feeding into CAMA centers except that calling number intelligence will be transmitted (by means of multifrequency pulses) over the line used in making the call after the called number has been dialed and before the CAMA equipment sends on the call.

At this time there is no way of knowing whether ALI equipment can be justified from an economic viewpoint for a very small office, but it probably will be installed ultimately even in small offices by the Bell System since it will offer definite integration advantages to them in providing a uniform type of service. This does not mean that an Independent office feeding into a Bell CAMA center with operator interception will be forced into providing some form of automatic line



## FIRST TELEPHONE

BY Thomas Hart Benton

When the new telephone is installed, the newlyweds *know* they have set up housekeeping.

With every telephone goes a directory to be worn threadbare by the time a new one is issued. New subscribers can find thousands of uses for the traditional American guide to better living.

From association with our clients, we know that telephone men are dedicated to public service. Nothing distresses them more than inability to provide complete service to new subscribers.

The Loomis Advertising Company believes a well developed directory is a major step in rendering complete telephone service.

When you turn over to Loomis Advertising Company the many irksome details of building a modern telephone directory you gain in two ways. You have a directory that is second to none in appearance, utility and revenue. You free personnel to do what they can do best—provide telephone service.

You're invited to get further details of Loomis' complete telephone service—without obligation on your part. Just call or write the Loomis office nearest you.

# LOOMIS

ADVERTISING
COMPANY

**762 cities and towns in 20 states are served by 246 Loomis-built directories.**

We have commissioned Mr. Benton to draw four scenes of American life. A limited edition of 9 by 15-inch prints suitable for framing has been ordered. We think they offer a nice public relations touch to telephone office decoration. To get your Benton print FREE, write Wesley H. Loomis III, 810 Baltimore, Kansas City 5, Mo.

*Lifts YELLOW PAGE revenue... Builds PUBLIC RELATIONS*

*"Where to call"*

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HArrison 1270

**FORT WAYNE**
229 E. Berry St.
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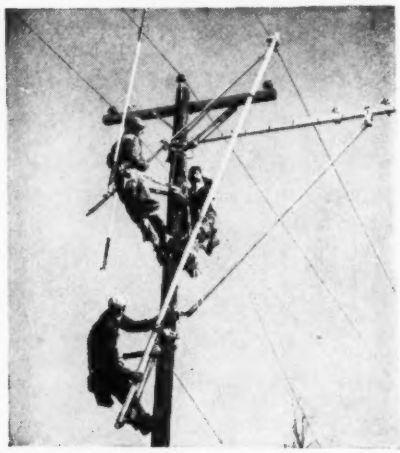
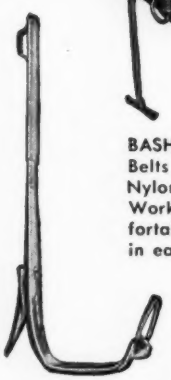
Bashlin's
Quality
FOR OVER 30 YEARS



TOOLS OF SAFETY . . .

BASHLIN Quality Body Belts with the additional Nylon Safety Feature . . . Work Safely . . . Comfortably . . . with tools in easy reach.



BASHLIN Quality Alcoa Aluminum Alloy Adjustable Climbers with replaceable gaffs . . . There is nothing better anywhere!

BASHLIN'S Nylon and leather Safety Straps . . . Bashlin Quality, of course.

You Can't Afford Anything LESS Than the BEST—
Buy BASHLIN
Highest Quality For Over 30 Years
*Distributors in Strategic Areas in U.S.A.*
EXPORT: Copperweld Steel International Co.
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*Ask for . . .*
CATALOG NO. 55

W. M. BASHLIN CO.
GROVE CITY, PA.

identification when all of the Bell offices feeding into the center are so equipped.

The Bell people expressed their opinion that some operator interception will be needed, for identification of rural lines, for many years and even if they ultimately had no such requirement for their own purposes, operator interception would be retained as long as it was required for any office in the CAMA network.

(4) CAMA equipment has a limit to capacity, like most equipment. Therefore, in large metropolitan cities there may be more than one CAMA unit.

(5) It is not contemplated that operators will ever route calls through CAMA equipment, whereby the CAMA equipment mechanically would produce the recording and timing information for billing purposes.

The reasons for this are these: (a) Person-to-person calls would require a separate toll line group in order to by-pass CAMA, otherwise CAMA would frequently record as completed a call which was not completed; (b) timing of the call (for charge purposes) is under control of calling party which means that if call were handled by a telephone company operator the call would continue to be timed until she removed her cord.

However, all that CAMA equipment requires for operation other than identification is a normal dial pulse from a subscriber's telephone. Thus, any make equipment may operate into CAMA centers.

(6) Independent participation in CAMA has the effect of transferring to the CAMA center (assume Bell) certain functions (as ticketing, sorting, preparing in part at least the toll settlement) which normally are included in A and B toll settlements.

The tentative thinking of Bell is this: These functions will be billed to the Independent, as applicable, on a *cost* basis. These costs will be included in the costs of handling interchanged business for intercompany settlement purposes. They may be more or less than the costs of handling in the current manner.

(7) As to the information furnished the Independent company for billing and commercial office purposes, where the Independent participates in CAMA with Bell, Bell can furnish the data in "about any form" we want and are "willing to pay for."

Included in the variety of "forms" available would be punched cards, or a printed statement. The perforated tape, however, would not be used because it would include data on Bell calls as well as our (Independents) own.

It should be pointed out that AMA is a directly associated unit used in conjunction with crossbar systems. CAMA on the other hand is not directly associated with any one office and does not have to be in the same building with any of the central offices it serves, although there probably would be economic reasons for placing it in or near the largest office served.

When the office in the center of a CAMA area is No. 5 crossbar, the unit for CAMA usually will be an AMA unit modified so that the normal AMA equipment will function for the home office and by using a different entry to the same base equipment, it will serve other offices or exchanges on a CAMA basis. This avoids installing both an AMA and a CAMA unit at one place. This can be done only where the home office is No. 5 crossbar.

[**EDITOR'S NOTE:** *Members of the USITA Dial Interexchange Committee making the above report are: F. E. Norris of New York City, chairman; E. T. Burgess of Bellevue, O.; W. R. Jarmon of Spokane, Wash.; K. L. Lawson of Lincoln, Neb.; L. L. Ruggles of Chicago; H. B. Siebken of Madison, Wis., and O. M. Westrup of Mattoon, Ill.*]

## Emergency Party Line Use Bill Passes North Carolina House

A bill introduced in the North Carolina legislature on Apr. 25, which would make it a misdemeanor to refuse to yield a party line when it was reported needed for a fire, police, medical call or other emergency, was passed by the house of representatives on Apr. 27 and sent to the senate.

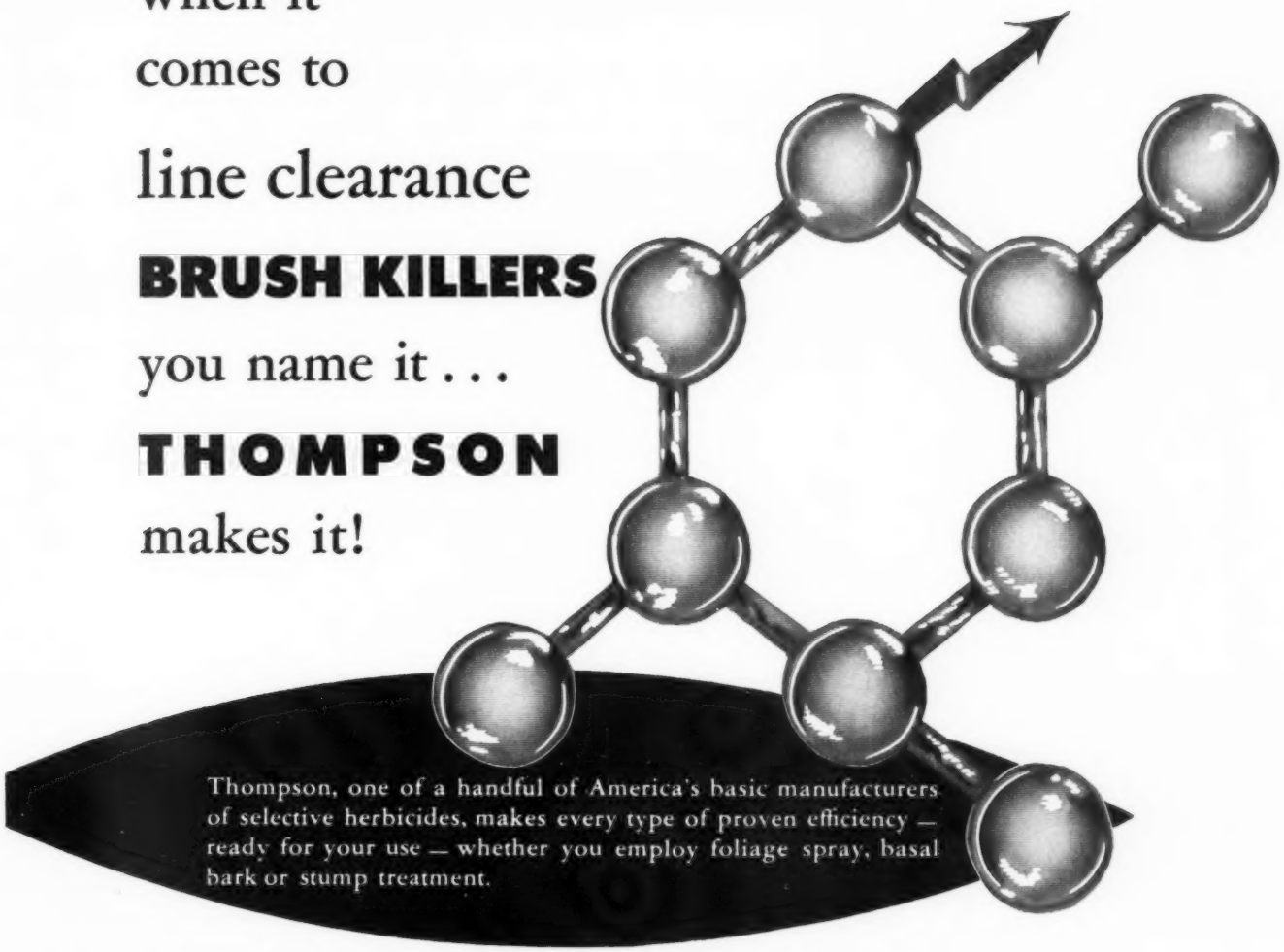
The measure also would make it a misdemeanor to state falsely that an emergency exists.

The bill defines "emergency" as a situation in which "property or human life are in jeopardy and the prompt summoning of aid is essential."

It was introduced by Reps. Sam Worthington and Clarence Stone.

**"Industry very often has felt that it is misunderstood by its friends—to which I subscribe. I am sympathetic with those industry-supported agencies which have been attempting to interpret the American system of free enterprise to our people. These approaches, however sound, have had some inherent weaknesses, one of which, however unjustified, is the charge sometimes made that industry's story is one-sided and self-serving; another is that such attempts very often do not reach the right people."—A. A. STAMBAUGH, *chairman of the board, Standard Oil Co. of Ohio.***

when it
comes to
line clearance
**BRUSH KILLERS**
you name it . . .
**THOMPSON**
makes it!



Thompson, one of a handful of America's basic manufacturers of selective herbicides, makes every type of proven efficiency — ready for your use — whether you employ foliage spray, basal bark or stump treatment.

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BRAMBLCIDE
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BROAD SPECTRUM . . . or LOW VOLATILE . . . whichever you prefer, Thompson's delivers *more kill per gallon* because every gallon is fortified with a new and exclusive surfactant perfected in the Thompson laboratories. No other "creeping agent" duplicates its performance.

MORE GALLONS PER DOLLAR . . . when you specify Thompson you get a finished product from the basic producer . . . your most economical method of buying.

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**NEW!**

*Thompson's exclusive Poison Ivy-Oak Bomb. Shoot noxious plants dead — roots and all. Stop future regrowth. Place a bomb on each truck for linesmen's use. $12.00 (case of 12 bombs)*

SPECIFY . . . Thompson Chemicals FIRST NAME IN BRUSH KILLERS

*Order through*
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**THOMPSON CHEMICALS CORP.**
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**COTTON**
Serviceable for all around uses. Standard everywhere.

**NYLON**
Smooth texture, easy to handle. Preferred for switchboard use.

**NEOPRENE**
Very popular because easy to keep clean. Moisture and grease proof.

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**CORDS**

**the WORLD'S FINEST**

**...for every purpose!**
**...for every instrument!**

Take your choice—Neoprene, Nylon or Cotton. They're all high quality cords made in accordance with Runzel high standard of quality. We carry large stocks of cords to meet every need. Our geographical location means Quick Service.

**RUNZEL CORD & WIRE CO.**

4723 W. MONTROSE AVE. • CHICAGO 41, ILLINOIS

# news on new PRODUCTS

**DITCH DIGGER**—The Earl H. Pence Co., Inc., distributors of the Agricat, a crawler tractor, has announced the addition of another labor and money-saving attachment designed specifically for use with the Agricat.

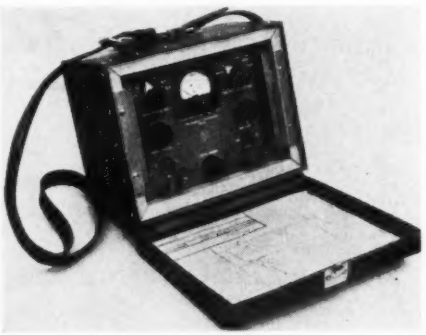
The new attachment, known as the Agrihoe, is an hydraulically-operated backhoe which converts the Agricat into a ditch digger.

When used on the Agricat (dimensions: 58 inches long, 38 inches wide, 41 inches high) with interchangeable buckets of 9-inch or 12-inch widths, the Agrihoe is suited to tight-spot trenching and digging, eliminating the costly and slower hand labor normally associated with this type of job.

Over-all specifications show that the Agrihoe has a 10-foot reach, can dig to a 6-foot depth, and load to an 8-foot height. It is capable of a variety of digging operations, in addition to being used to great advantage in backfilling or rough grading. Request NP 386.

• • •

**TRANSMISSION TEST SET**—A new transmission test set developed by Northeast Electronics Corp., provides all of the equipment required to make transmission tests on communication circuits covering the voice frequency band.



This set is completely self-powered and compact. It contains additional provisions for measuring the most important dc values of voltage, current and resistances, as encountered in any telephone system. The unit can be used to make transmission measurements on toll lines.

In addition, the provision of bridging resistors and suitable blocking condensers also permits its use for transmission measurements on subscriber lines.

The oscillator can be switched to provide any one of six frequencies in the voice frequency band, 250, 500, 1,000, 1,500, 2,000 and 2,500 cps. It employs a transistor-oscillator as a source of

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608 S. Dearborn St.
Chicago 5, Ill.

Please have the manufacturer send me without obligation the literature indicated by the following numbers:

| | | | |
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| NP386_____; | NP387_____; | NP388_____; | NP389_____; |
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| NP394_____; | NP395_____; | NP396_____; | NP397_____; |
| NP398_____; | NP399_____; | NP400_____; | NP401_____; |

Name..... Title.....

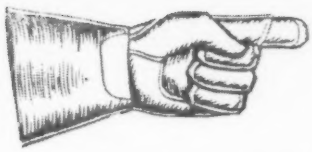
Company.....

Street.....

Town and State.....

5/14/55

# Automatic's pointers for plantmen and managers



## Heads turn, coin boxes jingle with Alcoa Aluminum Booths

All eyes are on the new Alcoa aluminum booth, which users find pretty hard to resist. Made by Aluminum Company of America, it's big—roomy—clean looking—colorful . . . packs a terrific sales appeal! And it offers you the opportunity to save. You save on maintenance because the Alumilite finished frame does away with painting, always looks spotless. You save on transportation costs because of aluminum's lighter weight. And you can save even more by buying the booth knocked down, ready for assembly. All necessary accessories to operate the booth efficiently are part of the standard booth. These include fluorescent lights, wire inlets, integral kick plates, door closing device, spring door stop, directory shelf and racks. Take advantage of the great potential revenue that's yours on the highways and in the business districts of your community. Call the nearest Automatic Electric warehouse or area representative and order your Alcoa booths today!

## TBM Service Entrance Mast for better booth installations

The TBM Service Entrance Mast provides complete service entrance facilities for your outdoor booths with lower cost and easier installation. Raises power and telephone lines for proper ground clearance, looks better, lasts longer. Costs less than any comparable installation. The standard mast is furnished complete with two conduits, insulators, wire holders, entrance devices. Meter socket, breaker box, flood lights and time switch can be ordered separately.

| Cat. No. | Description | Each |
|---|---|---|
| TBM-12 | 12-foot Mast (standard) | $34.50 |
| TBM-14 | 14-foot Mast (standard) | 36.25 |

Prices are F.O.B. Chicago and subject to change.

## "Showing the way" will increase your revenue

Highway Directional Signs tell passing motorists exactly when and where they'll come to an outdoor paystation. Remind them to make that call. The word "Telephone" is printed right on the blue and white sign, while the completing messages, "2 Miles", "1 Mile", and "Here" are separate emblems that adhere fast to the sign. You can order any or all three messages to fit your needs.

| Cat. No. | Description | Each |
|---|---|---|
| S-7272 | Highway Directional Sign | $9.80 |
| S-4133 | Emblem "2 Miles" | 1.10 |
| S-4132 | Emblem "1 Mile" | 1.10 |
| S-4131 | Emblem "Here" | 1.10 |

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# construction and maintenance DIGEST

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- **Wire winks at weather**
- **Profitable noise**
- **Money-go-round**
- **Die-hard battery**

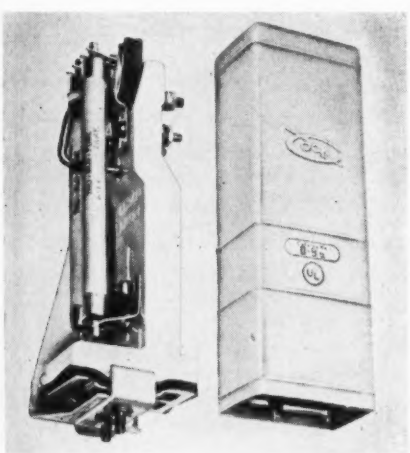
Published every week to help you get the most out of your materials and supplies dollar

*by C. J. Reynolds, Stromberg-Carlson*

The few dollars you spend on *reliable* equipment today will be repaid a hundredfold in lower maintenance costs for years to come. Protect your investment with the double guarantee offered by Stromberg-Carlson. First, leading manufacturers build this equipment, and guarantee it. Second, because we recommend and sell this equipment to the telephone industry, we *also* guarantee its performance!

### Protect telephones from lightning

No larger than a good-size candy bar is the Cook 09u telephone protector shown here. But it can save you a lot of grief and you can protect single circuits, both indoor and out.



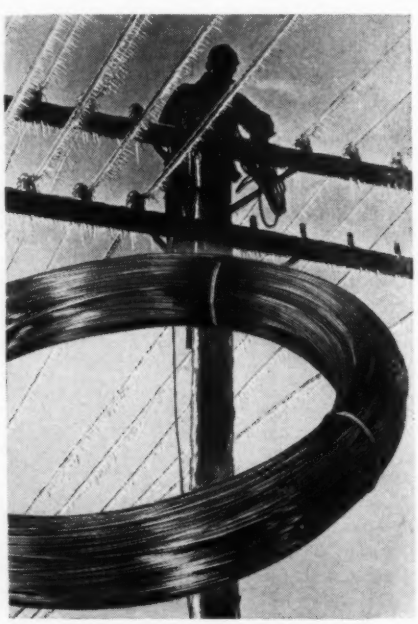
Individual circuits are protected by small unit, measuring 6"x2½"x1¾".

The body is a single piece of heavy white glazed porcelain. Lightning arrestors are two Tru-Gap dischargers, two flat carbons mounted on a copper ground, and two A-9u 7-amp. lavite fuses. Neoprene gasket locks out insects, dust, snow, etc.

### How to laugh at ice, wind

Ice and wind can play havoc with your service—and maintenance costs—when line wire is too weak to withstand the onslaught of weather.

To save the nuisance and expense of excessive service calls, we have available a wire of exceptional strength—rustproof Copperweld Line Wire, a tried and true friend of telephone men all over the world.



Longer spans, top weather protection are possible with this extra-strong wire.

Its rugged strength permits longer spans, with greater protection against storm damage. Its copper covering provides better transmission characteristics than any other high-strength conductor.

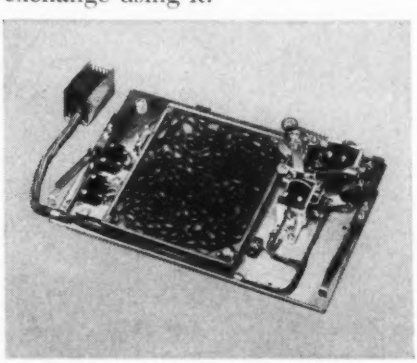
### Noise can be money!

Take a business subscriber who has a telephone in some extremely noisy location—and who has finally decided to do something about it. Would you rather have him spend money in building a soundproofed booth—or give **you** the money as monthly income on a telephone which completely licks the noise problem?

The GAI-PHONE is such an instrument. It has a special transmitter that actually creates a "Zone of Quiet" around the handset—even in a spot as noisy as a boiler factory!

### The money goes 'round and 'round

Yes—when the magnetic tape inside this XY® toll ticketing trunk recorder goes around inside the glass, it's making money for the exchange using it!



Completely accurate and completely unattended, the recorder

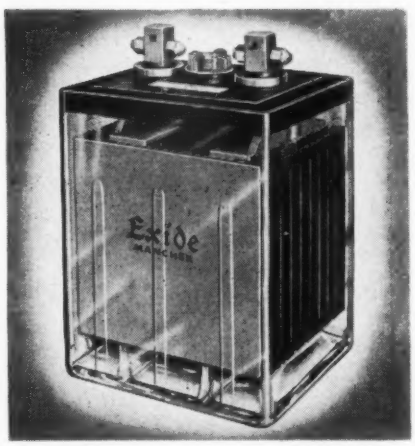
"listens in" on toll calls and picks up all the facts. Later, at a predetermined time and still without human attendance, it feeds its information into a playback which, in turn, activates printing equipment to produce either tickets or punched cards.

If you have toll problems in your future, investigate XY toll recording right away.

**Protect yourself from battery failures**

You can use Exide Manchex Batteries for central office and private branch exchange equipment, and be sure you'll get a supply of power when you need it. These batteries have been proven daily in exchanges of every size, and for 67 years Exide Batteries have been serving the telephone industry.

The manchester positive plate with its exclusive button-type construction provides exceptionally




Old age, even high discharge rates, have little effect on this battery.

long life. Latest developments on molded glass jars permit compact space-saving installation.

Heavy terminal posts with copper inserts provide extra conductivity for sustained voltage at high discharge rates. Microporous rubber along with slotted plastic separators, are impervious to chemical and electrical reactions. Plastic spacers assure plate alignment.

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**audio frequency power and is capable of delivering an input level of 0 dbm into a load resistor of 600 ohms with less than 5 per cent distortion.**

**A level control on the oscillator permits the exact setting of its output to any desired level between 0 dbm and —15 dbm. To test low impedance circuits in the order of 50 oms, an additional low impedance output range is provided.**

**A condenser is incorporated to block all external dc currents from the oscillator circuit; furthermore, in the "oscillator-off" position, the oscillator circuits are completely disconnected for transient protection.**

**Both the oscillator and the meter can be independently switched to either the "T" or "L" terminals, permitting, for example, loop attenuation measurements. When both the oscillator and the meter are connected to the "T" terminal, the level can be set to zero or to any other desired lower level.**

**The meter transfer switch is so arranged that the meter can be transferred to the "L" terminals for other uses, without affecting the level at "T." With the oscillator connected to the "L" terminals, this feature is inoperative.**

**The special meter employed in this set is of the rectifier type and is used to measure incoming levels appearing on the "L" terminals within the range of +3 dbm to —15 dbm. It has a maximum deviation of ±1 db over a frequency range of 60 to 20,000 cycles.**

**It is, therefore, also suitable for measuring transmission levels of carrier systems in the lower frequency ranges. The same maximum deviation of ±1 db applies over the temperature range of O°C to 40°C.**

**The meter can be switched to operate in either a bridged condition or on a 600-ohm termination. In either case, a dc blocking condenser is inserted in series with the meter. These condensers in the meter and oscillator circuits permit the use of the set on toll lines carrying dc voltages or subscriber circuits.**

**When used in the "600-ohm" terminating position, a resistance of approximately 750 ohms is connected across the "L" terminals. This feature establishes the dc path that may, for instance, be required on subscriber lines to hold the line relay-operated.**

**In addition to the level measuring ranges, four additional ranges have been incorporated. The 0-100-volt ac/dc range permits the measurement of battery voltages; open circuit voltages at the subscriber's station; ringing voltages, etc. The 0-100-milliampere ac/dc range permits the testing of transmitter currents at subscriber's sets, current flow through relays, etc.**

**The high resistance scale permits reading resistances as high as 40,000 ohms, and can be used to test lines for maximum permissible leakage. The second scale covers the range of 0-1000 ohms and permits continuity checks and measurement of components such as repeating coils and delays having a resistance as low as 10 ohms.**

**The instrument is housed in a case 8 inches x 6 inches x 3½ inches and weighs four pounds, inclusive of the self-contained battery. The rated battery life is 200 hours.**

**Special models of this set, incorporating other oscillator frequencies, oscillator buffer-amplifiers, special functions, etc., can be provided. Request NP 387.**

• • •

**OUTDOOR BOOTHS—The Wynnco Products Corp. announces its 1955 model aluminum outdoor telephone booth in a choice of durable baked-enamel finishes.**

**Constructed of aluminum extrusions and aircraft type panels, with safety glass windows, the 33½-inch x 33½-inch x 85-inch booth is large and roomy, yet light in weight and economical to ship and install, according to the company.**

**Rainproof for outdoor use, large glass areas for providing good visibility and preventing vandalism and abuse, especially designed double-hinge doors, built-in ventilation, insulated roof and acoustical lining are some of the features of the new booth. Request NP 388.**

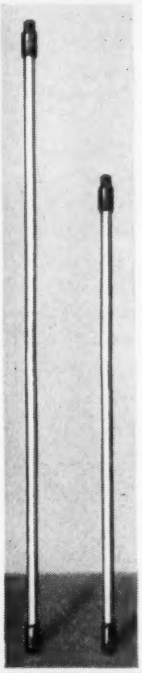
• • •

**REAR POWER SOURCE FOR LIGHT TRUCKS—The H. S. Watson Co. has announced a new rear power source and a new line of truck-powered tools designed to greatly increase the useful-**

**ness of pick-up trucks. Available in kit form, Watson rear power source equipment is adaptable to most light and medium-duty trucks. This rear power source terminates in a standard spline which permits driving a wide variety of equipment which would ordinarily require operation by tractor power take-off.**

**Now available for use with the Watson rear power source is a new light-weight post hole digger. This unit**

**product of the month**



**SCREW COUPLING DUCT RODS**

These important members of the Dodge family of telephone tools and accessories are turned from the finest grade of straight-grained second-growth hickory, carefully seasoned and selected before assembly. Rods are sanded and wax finished. Couplings are cast in octagon shape bronze with ¾" U. S. standard threads. Available in ⅞" diameter 3- and 4-foot lengths. Wt. 3', 65#/50; 4', 73#/50.

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Light in weight and clean. PENTAchlorophenol treated in our modern plant for protection against decay, moisture and insect damage.

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IMMEDIATE DELIVERY

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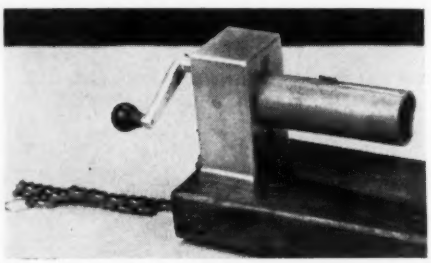
Spitzer Bldg. Toledo 4, Ohio


is designed for simplified one-man digging and is controlled by a built-in hand clutch. The Watson digger is also equipped with a slip clutch for extra operating safety.

A feature of the Watson digger is said to be its ability to be angle-operated any place with a 4 by 8-foot area without respotting the truck. Holes up to 40 inches in depth and 10 inches in diameter can be quickly bored, either vertically or at a sharp angle. Request NP 389.

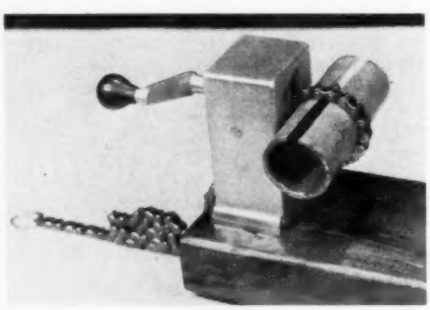
• • •

CABLE SPLICER'S TOOL — A tool known as the "Sleevemaster," developed by Techni-Serv Corp., should soon become a favorite standard tool in every splicer's tool kit. This new device replaces two of the most dangerous and time-consuming tools used by modern cable splicers. These are the backsaw, or hacksaw, and the bar-chain-music-wire now frequently used for splitting lead sleeves.



This new tool slits, splits, sectionalizes and constricts all repair lead sleeves and new construction sleeves where splitting is required. It leaves a minimum of metal work to be performed by the splicer. It splits lead sleeves of any size or length into a straight line with perfect meeting edges, slightly expanded in thickness to keep the hot metal from seeping through the seam to damage the conductor insulation.

After the split sleeve has been slipped over the splice, the tool may be used as a restrictor to bring the edges together so that the seam may be soldered with minimum effort.



The "sleevemaster" is a compact, accurately-constructed unit, measuring only 2 inches x 3 inches x 4½ inches, excluding the handle, and weighs slightly under two pounds. It is claimed that this tool will cut any size sleeve in one-tenth of the time required by other methods. Request NP390.

• • •

TWO-WAY RADIO EQUIPMENT — The General Electric Co. has announced a complete new line of FM mobile and base station two-way radio communication equipment for both 25-54 megacycle and 144-174 megacycle land-mobile radio services. Request NP392.

• • •

LIGHTING PLANT—A new lighting plant has been added to its range of models by the Katolight Corp. The design embodies removable carrying handles, wheels, and also an extension cord reel. A blower attachment for ventilating and heating for manhole work is also available.

These plants were designed to be used by telephone line crews, carpenters, highway departments, fire and conservation departments, power line crews and other applications where it is desirable to have a small plant that can be either carried or wheeled to any location.

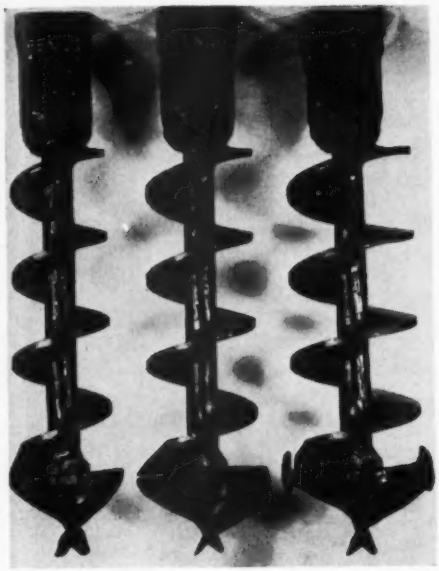
This power plant generates 60-cycle ac current at standard high line voltages. The generator is powered by a four-cycle engine and is provided with a means for easy hand-starting. Both generator and engine are filtered to permit operation of radio and television. Request NP393.

• • •

HEAVY DUTY EARTH AUGERS — The Petersen Engineering Co., manufacturers of PENGO earth augers, announces the addition of PENGO 6-inch, 7-inch, and 8-inch diameter heavy duty flight auger to their line.

These heat-treated manganese-moly alloy cast steel augers provide a small-diameter yet heavy-duty flight auger for use with earth boring machines.

The manufacturer states that this is the only series of small-diameter heavy



duty earth augers on the market today. Request NP394.

• • •

**MINIATURIZED ALLIGATOR CLIP**—So small it takes 100 to make a handful, Mueller Electric Co.'s new Mini-gator clip is said by the company to be an instance of *half* an alligator being better than *one*. Dimensions are: Length 1-1/16 inches (upper illustration's actual size); nose, 11/64 inch O.D.; weight, 1/20 ounce.

Mini-gators are manufactured in both steel (cadmium-plated), and solid copper. Separate, one-piece insulators are

available in both red and black, permitting on-sight identification of hot and cold test leads. The insulators fit skin-tight, do not materially increase the clip's size, but cover it right down to the nose and completely prevent shorts and shocks, according to the company.

The Mini-gator, together with its insulator, is claimed to be the most efficient tool yet developed for making quick, temporary test connections in the smallest crevices of today's increasingly-miniaturized and sub-miniaturized electrical and electronic equipment.

The insulator is of tough, high-dielectric vinyl plastisol. It flexes to permit full jaw opening to 3/16 inch, and is provided with a "lip action" slotted tip which keeps the nose and teeth covered on all outside surfaces.

A strong spring, plus fine teeth, give the Mini-gator a strong bite—sufficient to cut corrosion and protective coatings, the company states. The clip is designed for use with No. 20 or smaller wire.

The wire is first stripped for ¼ inch, inserted in a hole in the clip shank, bent back and soldered. Clinching ears are provided to grip wire insulation, relieving cord strain and preventing sharp bending of the wire.

The insulator fits very tightly and is most easily applied after moistening the clip. Unlike other Mueller insulators, it slips on backward over the nose of the clip, and may be put on or taken off at any time. Request NP395.

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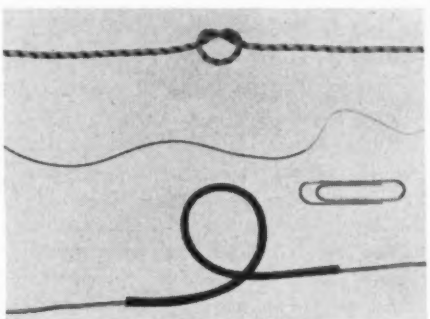
**COLOR-CODED TEFLON TUBING**—A new type of striped and solid-colored non-rigid thin wall Teflon tubing is

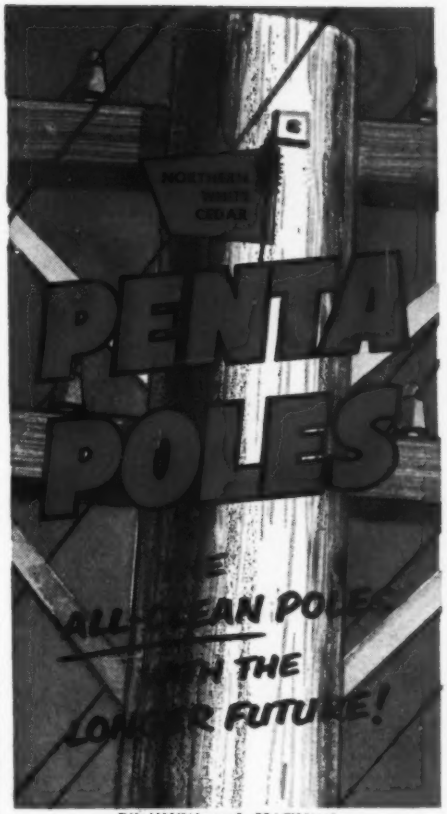


now available, Hitemp Wires, Inc., announces. This tubing is so flexible that it can be wrapped around its own diameter without cracking. It is particularly suited to color-coding applications, according to the company.

Because of its physical and chemical properties, the non-rigid Teflon tubing is useful in many electronic and electrical applications, especially where environmental conditions are severe. It has a high dielectric strength and can withstand temperatures from —90°C to +260°C. Resistance of the tubing to acids and other corrosive materials is very high (there are no known solvents). Teflon has zero water absorption and therefore the insulation characteristics of the tubing are maintained even at 100 per cent humidity the company reports.

Teflon tubing undergoes a 100 per cent electronic inspection for pinholes and flaws in production, the company says.

Non-rigid Teflon tubing is available in diameters to accommodate wire sizes from No. 26 to No. 10. It comes in 10-foot lengths (approx.) and can be easily cut with scissors for specific applications. It comes in 10 solid colors,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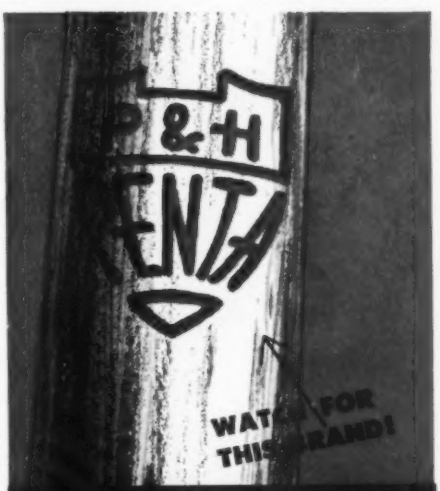


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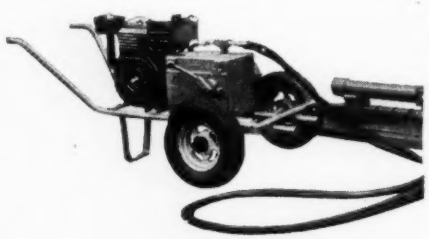
That's what a leading eastern utility reports as its experience with a GREENLEE Pipe Pusher on jobs as shown above. Let this remarkable tool make big timesavings and reduce job costs for you, too. With the GREENLEE Pusher, *one* man pushes pipe *under* streets, walks, floors, railways, lawns, etc. Eliminates extensive trenching and time-consuming tearing up, tunneling, backfilling, repaving. Often pays for itself on the first few jobs. Two models: No. 790 for pushing ¾" to 4" pipe; No. 795 for larger pipe and concrete ducts.



**POWER PUMP** for all models of GREENLEE Pipe Pushers. Makes the toughest pushing jobs simple, fast for *one man*. Average pushing performance: two feet per minute. Write today for complete details on timesaving GREENLEE Hydraulic Pipe Pushers.

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2065 Columbia Ave., Rockford, Illinois


and over 200 color combinations are available for color coding applications. Request NP396.

• • •

**HYDRAULIC EARTH BORING MACHINE**—This machine, states the General Machine Products Co., Inc., has many new features that will appeal to line construction contractors who have

many miles of poles to plant, as well as the Independent telephone companies who have only a few or replacement poles.

The digger when mounted on the front of a truck will save many man-hours because the usual five-man crew can be reduced to two men, since all operations are concentrated in the front of the truck, says the company.

This hydraulic earth boring machine is different from the previous pole digger in that the boring case is supported in a rigid frame which is attached to the derrick in place of the ground prop.

The case is equipped with two hydraulic motors, one for rotating the augur in forward or reverse directions and the other for driving the boring case vertically up or down on the supporting frame.

The outstanding feature of the digger will be appreciated by the operator who can exert several thousand pounds of down pressure or raising pull on the augur independently of the speed or direction of the augur rotation. The operator also can accurately displace all this power with finger-tip control, thereby saving many dollars for his employer by penetrating through soil that could not previously be bored by the ordinary machine, the company states.

This boring machine is so designed that the frame will absorb the torque reaction when unloading at high speed and stabilize the augur when digging through shale or uneven composition of soil.

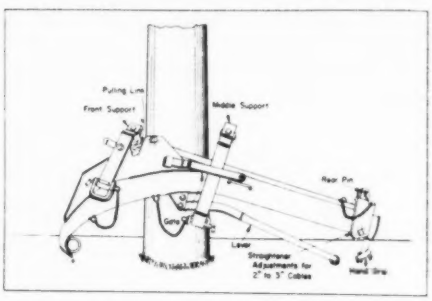
The hydraulic earth boring machine is equipped with an automatic pressure release which provides an overload-limiting device to protect the entire digger mechanism and the release requires no resetting for normal operation after the condition which caused the overload is relieved or has been corrected.

The hydraulic pump of 24-gallon capacity is driven by a side power take-off on the transmission.

General Machine Products' new hydraulic earth boring machine can be carried on top, quickly connected or removed from the truck, all handled with the aid of the derrick and the truck's power equipment. Request NP397.

• • •

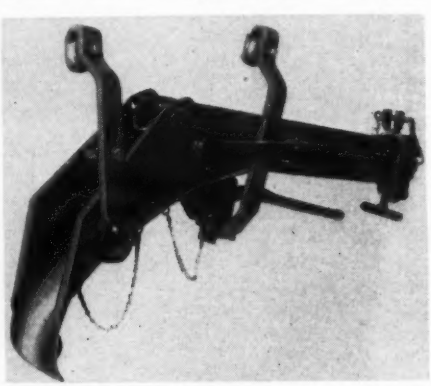
**AERIAL CABLE GUIDE AND STRAIGHTENER** — General Machine Products Co. also has announced that many telephone companies constructing new cable lines of a larger type cable will be interested to know that they can save many hours of installation time with the aid of the company's new




#7474 3½-inch aerial cable guide and straightener, which will accommodate cable that weighs more than two pounds per foot from a moving reel, with a capacity of up to 3 inches in size.

The direct lash method may be used where no obstructions exist such as trees, wires, etc., and the truck and cable reel trailer must be able to pass below the messenger strand on the side of the pole on which strand has been placed.

The #7474 cable guide and straightener, which works equally well with either lead or alpeth-sheath cable, is



pulled by the truck approximately 3 feet ahead of the cable lasher and, as the equipment approaches the pole, the man on the pole should stop the truck 2 feet short and pick up the remainder of the distance by the aid of the winch.

To transfer around the pole, one pulls down on the lever; swings the front support over on the strand; re-

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*Since the resistance of the relay is infinity below 60 volts, (The relay's normal breakdown voltage) the line remains normally free from paths to ground. Ringing voltages of over 60 volts ionizes the rare inert gases, and therefore is transmitted without difficulty.*

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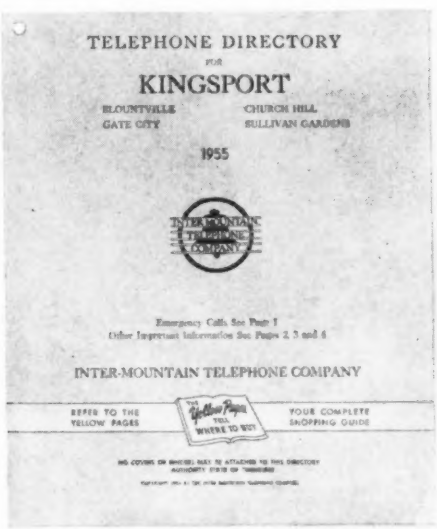


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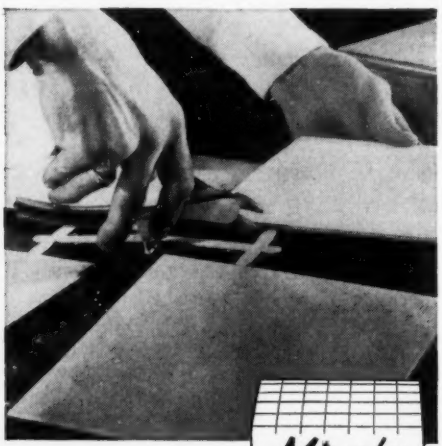
# "S-M-O-O-T-H CUTS —millions of them— Are Vital in Our Production"




"That's the kind of service we get from UTICA® Cutters and that's why we've been using them for over 5 years, after having tried numerous other makes," says Mr. George Reinhardt, superintendent of molding for Miraplas Tile Co., in Columbus, Ohio.

Miraplas is one of the nation's leading plastic tile manufacturers. Rigid quality control and dimensional perfection are top considerations at Miraplas. The clean, close cuts of UTICA® cutters contribute vitally to this.

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leases the lever, opens the gate, and then swings the middle support off the strand, taking up on the winch and stopping as soon as the middle support has cleared the suspension clamp.

When placing the guide on the strand, the front and middle supports should be on the side away from the pole and while in operation should be supported by the middle roller and rear pin, states the company.

The #7474 aerial cable guide and straightener is 40 inches long, 7 inches wide, 25 inches high and weighs approximately 60 pounds. Request NP-398.

• • •

**PRESSURE GUN AND HOLDER—** Also available from General Machine

Products Co. are two other items, a "B" pressure gun and gun holder.

The "B" pressure gun is used to inject plugging compound into cables for making pressure plugs. It is a screw-actuated cup type, operated by a ratchet wrench.

A handle is provided for holding the gun. Both end caps are removable for ease in loading and cleaning. The nozzle is replaceable.

Length: 7¼ inches; diameter of caps: 2⅝ inches. Weight four pounds.

The "B" pressure gun holder supports the pressure gun in a vertical position for loading and mixing plugging compound in the gun barrel.

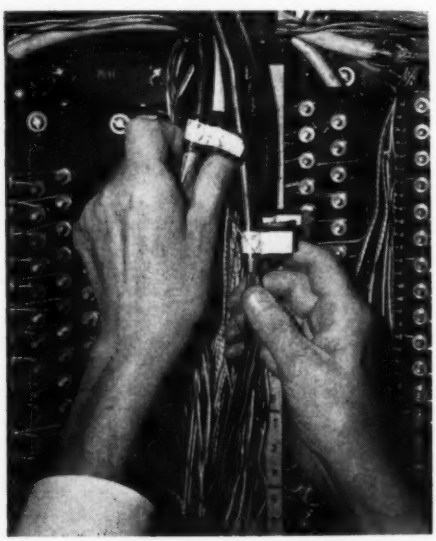
The holder consists of a metal frame for receiving the gun, and is equipped with four horizontal prongs to prevent slipping when the holder is secured to a pole, ladder side-rail, or other support. A spring-tensioned chain, 36 inches long, holds the gun holder firmly in place.

Dimensions: 3⅜ inches long; 2-5/16 inches high; 3 inches deep. Weight three-quarter pounds. Request NP399.

• • •

**TAPE FOR CIRCUIT IDENTIFICATION, ETC.—**Now it's easy to mark circuits right on the boxes, panel boards, or wires themselves using a new plastic tape called Labelon "Write on it" Tape, the Labelon Tape Co., Inc. announces.

This tape sticks without moistening to any clean, smooth surface. All necessary information regarding the circuit, including its number or service,



voltage, amperage, phase, ac or dc, can be noted on a strip of the new tape and applied anywhere on the box, or board or wire. Since Labelon strips off cleanly and can be applied and reapplied an almost unlimited number of times without losing its adhesive quality, changes can be made quickly and easily, the company states.

Smudging the writing on Labelon is impossible, for the writing is not on the surface of the tape at all, but actually appears *beneath* a transparent outer layer of tough plastic. This outer layer protects the writing against smudging, grease, dirt and most liquids, according to the Labelon company.

No pencil lead, ink or crayon is required, although they may be used. The pressure of the writing instrument alone brings out the writing—*any* dry,

blunt point can be used such as an ordinary lead pencil or stenciling stylus.

Another feature of the new tape is the way writing stands out boldly against the tape's white background. In addition, narrow bordering bands in the same color as the writing act as eye-catchers and help to quickly locate the label in dim light or against dull backgrounds.

Despite the ease with which the new tape can be written on, applied and re-applied, it provides a practically permanent label under even abnormal conditions, resisting aging and sunlight as well as heat and cold from —40°F to +150°F.

Among the various uses to which Labelon tape has been put in the telephone industry are: An aid to the equipment installer in identifying wires and cables (see cut); a record on the bottom of key sets to indicate where the set's terminal box is; and as a log of the amount of work done on a particular job — thereby indicating what stage of completion.

Other popular uses of this pressure-sensitive tape, not confined to the telephone industry, include marking and identification of tools and tool cribs, parts in manufacture, laboratory apparatus, articles for repair, file cabinets, packages for storage and prices. Request NP400.

• • •

COMPOUND MELTING FURNACE— The Insto-Gas Corp. announces a new compound melting furnace, the No. 1230, of the jumbo type. When equipped with a 14-inch No. 699 guard,

and the new five-gallon capacity No. 1603 compound pot, the new furnace offers the contractor a light-weight, instant-lighting heater that has many advantages over wood or oil compound heaters, according to the company.

For instance, if a pitch kettle boils over with a wood or oil furnace, the resulting fire is very hard to control, but with an Insto-Gas furnace, you can shut off the furnace flame immediately by simply closing the Insto-Gas cylinder valve on the cylinder which is located several feet from the furnace.

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Striking proof of dependability is shown in the results of tests made on a RectiChargeR after 15 years of continuous service. Engineers found it as good as ever — not the slightest impairment of electrical qualities — no mechanical deterioration whatever.

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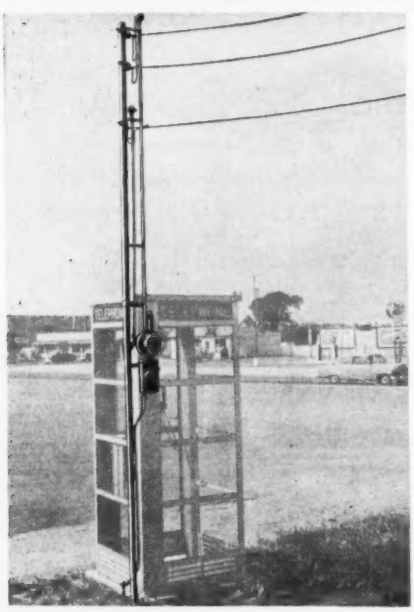

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**Insto-Gas also has a flame control that reduces the fire hazard by preventing the compound from boiling over.**

**There are many uses for this new Insto-Gas compound furnace, such as: Melting asphalt or pitch for roofs; tar for sealing seams in concrete; compounds for treating block floors; compounds for setting machinery; jointing compounds for clay or cast iron pipe. Request NP401.**

### Automatic Electric Co. Buys New Property in Chicago Area

C. S. Cadwell, president of Automatic Electric Co., Chicago, has announced that as a step to further expansion or consolidation of its manufacturing facilities, the company is arranging to purchase 170 acres of land in the Chicago area.

The property is in the city of Northlake, Ill., a community located 15 miles west of Lake Michigan. It is close to a projected superhighway into Chicago, and is served by the Chicago & Northwestern Railroad.

The property, which has for many years been operated as the Westward-Ho Golf Club, has been rezoned for industrial use, and the entire club area is being acquired by the company.

### Delmont, Pa., Exchange Is Cut Over to Dial

Delmont (Pa.) Rural Telephone Co., recently converted to dial operation with a 200-line Kellogg Relaymatic switchboard, according to Harold Payne, president and general manager of the Delmont company.

The conversion also involves the installation of 445 new magneto dial telephones and the construction of a steel building to house the new switching equipment. Mr. Payne estimates the cost of this modernization program to be about $70,000.

The new equipment is arranged to permit future participation in nationwide inter-toll dialing.

**"There can be little hope of a successful onslaught on chaos and cost until the underlying issue of the welfare state and its twin, big government, is squarely faced." — EDITORIAL STATEMENT, *The Wall Street Journal*.**


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Write for full data on Reel Jack No. A-1029 and other Simplex Utility Jacks.

**Pole Pulling and Straightening Jacks**—Save time, cut work crews necessary to pull, straighten or move poles. No. A-1538 has aluminum housing, 15-tons capacity, weighs 63 lbs.

**All-Purpose Jack** — No. 310A lifts, pulls, pushes at any angle. Four lift points. 15-tons capacity.

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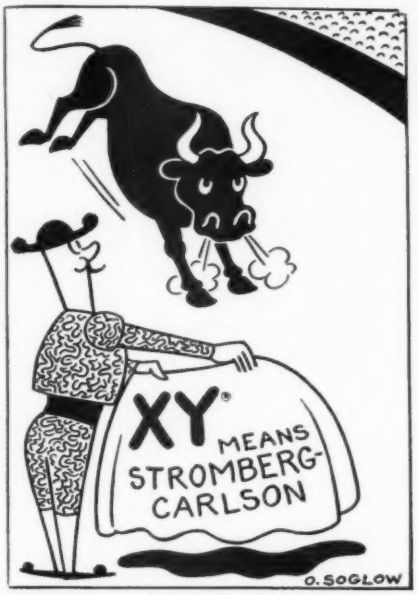


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40 Magneto Ringdown Lines
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#804-BA with W.E. #BIAL 4300 ohm ringer
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5 Bar 1600 or 2500 ohm
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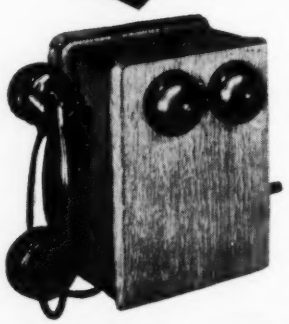
Black Lacquer Finish Unless Oak is specified.



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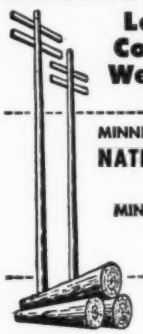

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COMBINATION, INSTALLER, REPAIR MAN. Must be familiar with Western telephone sets and superimposed ringing. Salary depending on experience. Answer to Plant Superintendent, Pecos Northwestern Telephone Co., Pecos, Tex.

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MANAGER for rapidly expanding commercial (cooperative) Rural Telephone System located at Lafayette, Tenn. Must have administrative ability to achieve and maintain efficient operations and develop sound expansion programs. Ability to hire, train and direct personnel in all phases of telephone operations. Technical, plant and commercial knowledge and experience desired. Permanent position carrying substantial opportunity for qualified person. Replies confidential. Please write Calvin Gregory, President North Central Telephone Cooperative, Inc., Lafayette, Tenn., P.O. Box 97.

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**STATION INSTALLERS**
**STEADY WORK, GOOD PAY.**
**MIDWEST LOCATION.**
**The Weikel Line Company, Inc.**
**FORT WAYNE, IND.**

**COMMERCIAL MANAGER**
**for 3000 station four automatic exchange operation Southwest.**
**Advancement to General Manager if qualified.**
**Plant operation experience desirable.**
**Opportunity for young man with experience and ability. Replies confidential.**
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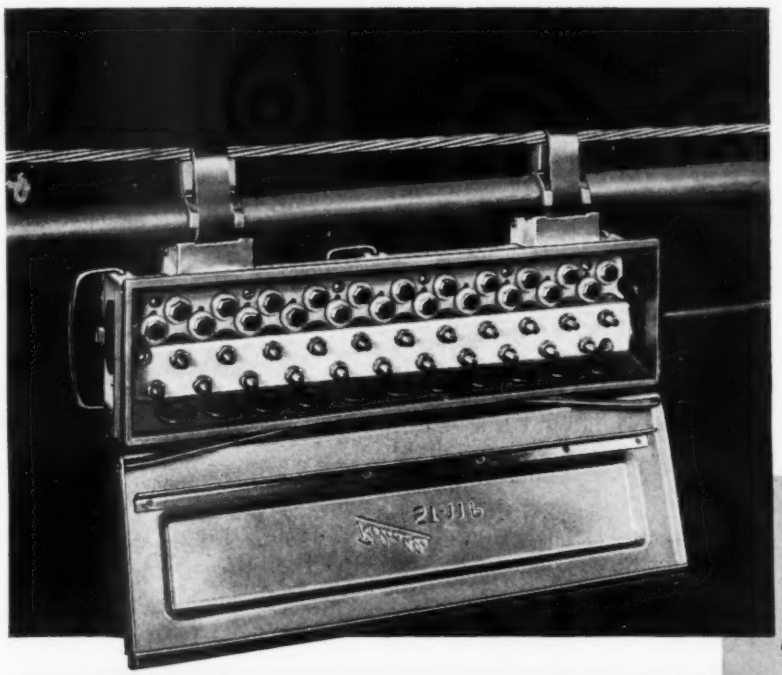

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3 Sizes
11, 16 and 26 pair.

3 Mountings
Strand, Pole or Wall.

3 Types
Unprotected,
Cable Protection,
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# a calf looks big...until you've seen a COW!

Right now, for example, you may be satisfied with the net revenue of your directory. But suppose it was possible to materially increase that return . . . and with no added effort on your part?

Our Complete Directory Service Plan, now operating successfully in over 4400 American cities and towns, has upped revenue return for telephone companies by substantial amounts the first year!

Like to make *your* directory look better on your Profit & Loss statement? A representative from our nearest office will be glad to talk it over with you.

The best equipped telephone directory publishing organization in the world.

## GENERAL TELEPHONE DIRECTORY COMPANY

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LEXINGTON, Kentucky · 152 Barr Street · Tel: 4-7618
LONG BEACH, Calif. · 604 Pine Avenue · Tel: 6-7221
MADISON, Wisconsin · Tenney Building · ALpine 7-1667
SAN ANGELO, Texas · 110 South Taylor St. · Tel: 6738
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